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WITH
INTERNATIONAL ABSTRACT

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PHYSICAL THERAPEUTICS IN CURRICULUM AND CLINIC*

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The immortal Osler during the meeting of the Medical and Chirurgical Faculty of Maryland in 1889, fearlessly indicted the system of medical education then largely in vogue.¹ Inspired with that zeal and fervor which is invariably the concomitant of enlistment in a righteous cause, he took up the cudgels for higher standards of medical preparation. Quoting briefly from his address: "It makes one's blood boil to think that there are sent out year by year scores of men, called doctors, who have never attended a case of labour, and who are utterly ignorant of the ordinary everyday diseases which they are called upon to treat; men who may never have seen the inside of a hospital ward and who would not know Scarpa's space from the sole of the foot. Yet, gentlemen, this is the disgraceful condition which some schoolmen have the audacity to ask you to perpetuate; to continue to entrust interests so sacred to hands so unworthy. Is it to be wondered, considering this shocking laxity, that there is a widespread distrust in the public of professional education, and that quacks, charlatans, and imposters possess the land?"

With uncanny foresight, Osler not only clearly envisaged the problem, but depicted the inevitable solution. "Legislative bodies could not support class legislation which would debar from patients the homeopaths and eclectics

whose curricula differed from that of the regular schools only in the matter of therapeutics. We cannot, however, escape from the important fact that in the eyes of the law we all stand equal, and if we wish legislation for the protection of the public we have got to ask for it together, not singly. I know that this is gall and wormwood to many—at the bitterness of it the gorge rises; but it is a question which has to be met fairly and squarely. When we think of the nine or ten subjects which we have in common, we may surely, in the interests of the public, bury animosities, and agree to differ on the question of therapeutics."

Sir William Osler lived to see the day when the standard of medical education and practice had been markedly elevated and many of the abuses against which he had so bitterly inveighed were corrected. These results were attained largely as a result of the propaganda for reform carried on by himself and other foresighted medical leaders, both individually and via organized agencies, such as the Council on Pharmacy and Chemistry of the American Medical Association and the American College of Surgeons. It is noteworthy that these results were obtained by educational rather than by legislative methods.

Meanwhile, and during the first quarter of the twentieth century, enormous strides have been taken in the arts and sciences in the devel-

*Read at sixth annual meeting, American College of Physical Therapy, Chicago, Nov. 4, 1927.

opment of the electromagnetic energies. It was only to be expected that in steadily increasing numbers the more venturesome disciples of Esculapius would attempt to apply these physical agencies in the treatment of disease. This was at first done almost wholly in an empirical manner, but often with satisfactory results. Gradually knowledge has become crystallized out of experience, and laboratory data has been collated of a confirmatory nature, so that this field of work as practiced by the leaders therein might be rightly stated to be in the process of transmigration from the qualitative into the quantitative stage of medical endeavor.

However, the development of non-medical and non-operative methods of therapy has not been an unmixed blessing. Men and women of little or no medical training have attempted to imitate the work of those who have mastered this highly technical field, and as a result an increasingly large and testimonial contributing clientele should indicate to the thoughtful observer the pecuniary advantages to be derived from dispensing medical attention, which is something for which the patient is willing to pay (usually for quick symptomatic relief only) rather than medical service—which is something the patient really needs. In the hands of the charlatan, whatever he dispenses is the universal panacea, whether it be medicinal, operative or some form of "drugless healing." All too often, some form of physical therapy has been substituted for some other agency of proven worth. On the other hand, many times because of ignorance or prejudice, the valuable adjunct available in some form of physical therapy has been denied the patient. The one is just as much an abuse as the other, and it is my belief that the responsibility for this should be put up squarely to the members of the medical profession. It is the duty of the physician to be able to evaluate the therapeutic agencies available for the relief or cure of each individual patient. It is the duty of the medical schools to provide each graduate with the opportunity to acquire this knowledge. Whether he chooses to become proficient in its technical application is beside the question. No one other than a well trained medical man should attempt to carry out highly technical procedures in any

line of work, and no one except a well qualified medical man should prescribe any form of treatment for his patient—either medicinal, operative or physical therapeutic.

Nurses and lay technicians should not be required by physicians to assume full responsibility for the prescription and technical application of physical therapeutics. Hospital departments should always be under the supervision of a medical man who is well trained.

We should heartily endorse the recommendations of the Council on Physical Therapy of the American Medical Association in every particular, and the above recommendation as to the operation of hospital departments and the responsibilities of technicians is especially timely. Likewise, the suggestion to premedical schools, to nurses' training schools and to normal colleges of gymnastic education, of the addition to their curricula of a course in biological physics, to follow that given in academic physics or mathematical physics as it is now usually taught. Such fundamentals are far more readily absorbed in the early years of scholastic life than they are in later years.

Rather than attempt to cover the entire field of physical therapy education in this country, and more especially since this has been already well covered by Granger,² Hirsch,³ Coulter,⁴ Kobak,⁵ Elsom,⁶ Titus,⁷ and others, the essayist prefers to give his own experience in this work within the past few years, in connection with various teaching institutions in Indiana, and with the University Hospitals. Physical therapeutics was first taught at Indiana University in 1908. It was a regular, required course to the seniors, a one-hour per week lecture course covering roentgenology, radiology and electrotherapeutics. As a student in 1915, under Dr. E. O. Lindenmuth, my carefully preserved notes for this course gives information mostly upon the x ray, galvanism, a very little on high frequency and so-called "fulguration," but nothing upon either medical or surgical diathermy as we now teach them. A little was given on the Finsen light, but otherwise nothing on phototherapy. Faradic and static were mentioned briefly, but without emphasis. Hydrotherapy and mechanotherapy were mentioned,

but nothing upon sinusoidal or other wave form currents.

The course as we now give it requires thirty-six hours, or one semester hour for each of the two main subdivisions—roentgenology and physical therapeutics. The course in radiology is given by the assistant professor of roentgenology. The course in physical therapeutics is also a required course, given to seniors, who are required to pass an examination as for other courses given in the medical department. One hour per week for a full semester, or eighteen hours, is given over to lectures and demonstrations. The senior students serve as clinical clerks in the wards, and are required to follow their patients to the various departments, such as x ray, surgery, or physical therapy for observation of their treatment. The lectures cover the following subjects: general considerations, electromagnetic spectrum, galvanism, galvanodiagnosis, galvanoprognois, galvanotherapeusis, sinusoidal and other wave form currents, faradic, static, thermotherapy including radiant light and heat and infra red, medical diathermy, autocondensation and high frequency, surgical diathermy, phototherapy including actinotherapy via quartz mercury vapor generators and carbon arc lamps, heliotherapy, mechanotherapy, massage, occupational therapy, corrective gymnastics, and last but not least, hydrotherapy. A complete set of Zander apparatus, and gymnasium for corrective gymnastic exercises is utilized at the Riley Memorial Hospital, as well as the department of occupational therapy. Up to date two units of physical therapeutic equipment serve the three university hospitals and are available for clinical instruction to students.

The physical therapy clinic is operated chiefly at the general hospital, although the same record forms serve all hospitals. The records have been planned with great care to make them conform to the requirements of the American College of Surgeons. The requisition for treatment is filled out in duplicate by the senior interne on medicine.

This requisition contains pertinent information about the patient, including diagnosis, present condition, and physiotherapeutic pre-

scription. This is usually dictated by the director of the department during regular ward rounds, but if written under the supervision of the chief resident physician, is subject to revision by the director on his next visit. The orders are carried out by the technical staff of nurses and aids, just as any other written order for medication or treatment is carried out. The technicians are responsible to the director for the faithful execution of orders, and the responsibility rests upon the chief resident physician for the safety of the patient, and upon the director for the technical application of the energies to the patient. Both are responsible to the university staff which meets monthly in administrative session. At this time a report of the department is made, which includes the number and kind of treatments which have been administered. A yearly report of all different types of lesions, their treatment and results is also made. This report is compiled from the records which consist of the following:

1. The requisition sheets, that contain complete information to date, and show at a glance the dates, form and duration of each treatment, and one sheet remaining in the permanent files of the department—the other filed away with the history record.

2. Daily ledger. Serial record of each treatment to each patient as administered.

3. Card index, classified by diagnoses, Bellevue Hospital nomenclature. Each card shows the number of patients treated under each classification, the type of treatment and the results as evaluated by the staff. From the standpoint of pedagogy I consider these records invaluable. We have yet to complete an efficient follow up system, in order to make the set of records satisfactory for our needs.

Postgraduate instruction to internes is given in the clinic.

Each interne has a rotating service. During his period of one month as senior in medicine he is responsible for all physiotherapeutic prescriptions under supervision of the medical resident and the director of the department. He accompanies the director upon his ward rounds and gives physical therapeutic treat-

ments under his supervision. He does minor surgical diathermy and assists in major cases. The medical resident does as much in physical therapeutics as his other more administrative duties and his own particular inclination permits. Most of the internes and resident physicians eagerly grasp the opportunity to learn the technic and administer physiotherapeutic procedures.

In the early summer a six weeks' course is given to postgraduates in medicine. This course is given to conform with the recommendations of the Council on Physical Therapy.⁸ It is really a repetition of the course given the seniors, with the addition of clinical demonstrations at the hospital. Most of the men who take this course take also one or other of the regular postgraduate courses in medicine or surgery or one of the clinical specialties.

In addition to the above courses the essayist has given more elementary courses to the seniors in three of the nurses' training schools and in the Normal College of the North American Gymnastic Union. In this elementary course technicalities are avoided. General principles are outlined, indications given, and limitations and contraindications stressed.

In conclusion I wish to acknowledge the quality of the instruction as given at other institutions, such as that given by Coulter and Bovie at Northwestern, Granger at Harvard, Kobak at Rush, Hirsch and Snow in New York, Titus at Columbia, Grover at Colorado, and Elsom at Wisconsin, and many other earnest educators. Last but not least we should appreciate the high standard of instruction given by this, our own College of Physical Therapy, here in Congress assembled.

CONCLUSIONS

1. The general standard of applied physical therapeutics is low despite the high ethical plane upon which the leaders in this specialty operate.

2. So-called "drugless healers" abound in the land, most of whom are not only incompetent but a menace to public health. Many of these carry the appellation of "doctor," a de-

gree which has a different significance in the minds of laity from that in the minds of professional men.

3. Most of the members of the medical profession, both rank and file, are lamentably weak in their knowledge of both the scope and the limitations of physical agencies. Physical therapy is not apparatus therapy, and is capable of doing harm as well as good in selected cases.

4. Neglect of this field by high type medical men provides the opportunity for the so-called "drugless healer." Legislation against this abuse has proven futile in the past, unless such legislation provides as it does in Indiana for a recognition of these parasites upon regular medicine, in order that in the future no further members of their cult may be licensed without qualifying themselves in the premedical and preclinical scientific branches.

5. The best solution of the "drugless healer" problem is scientific physical therapeutics, practiced only by medical men or under their immediate supervision, and only as the triad of medicine, surgery, and physical therapy. This can be accomplished in only one way, by permitting its practice only by those individuals who, by virtue of training and experience, are safe to practice medicine or surgery. We should support in every way the stand of the Council on Physical Therapy in its efforts to standardize this whole field of work, not so much by legislation as by education. Furthermore it is my belief that this education should begin with the premedical schools⁹ and continue in both the medical school and hospital clinic.

BIBLIOGRAPHY

1. "The Life of Sir William Osler," *Harvey Cushing*. Oxford Press, 1926.
2. *Granger, Frank B.* "Utilization of a Department of Physical Therapy as a Teaching Center." *J. Am. Med. Assn.*, March 12, 1927.
3. *Hirsch, A. B.* "Chairman's Report of Committee of Education of American Electrotherapeutic Association—New York Session, 1927.
4. *Coulter, John S.* Unpublished paper on Physical Therapeutics at Northwestern University. Read before the Academy of Physical Therapy—Detroit Session, 1927.
5. *Kobak, Disraeli.* Presidential address, Clinical Congress of Physical Therapy—Chicago Meeting, 1927.

6. *Elsom, J. C.* "Vital Problems in the Teaching of Physical Therapy." Transactions of American College of Physical Therapy—Chicago Session, 1927.

7. *Titus, Norman.* Archives of Physical Therapy, X Ray and Radium, January, 1927.

8. Council on Physical Therapy. "Preliminary Report of the Committee on Education." J.A.M.A., March 19, 1927.

9. Council of Medical Education and Hospitals. J.A.M.A. March 19, 1927.

DISCUSSION

DR. NORMAN E. TITUS (New York): Dr. Kime neglects a later statement of Osler's, just before he died, when he said that the future of medicine depended upon a better knowledge and use of three branches lately come to notice. First, psychotherapy; second, endocrinology and finally and by far the most important, physical therapy. Many of the so-called "big" men of medicine and surgery today do not realize how much ahead of them Osler really was.

Strangely these three subjects are still widely practised by quacks. But one cannot say for the same reason. The first two are still suffering from empiricism, while the last, physical therapy, has lately recovered from this complaint. Of course, all forms of therapy have to grow out of the embryonic empirical stage and I have no hesitancy in saying that physical therapy is the latest kind of therapy to hatch out completely and no doubting Thomas has to "candle the egg" to find out if it is good. The product can stand on two legs now, and has found its own place in the sun. One has to break the egg and examine the contents of the other two.

But we who know the worth of physical therapy, still have to guard against the over-enthusiasm that has distorted the viewpoint of the pioneers. One of the greatest checks on this over-enthusiasm is constructive criticism by members of a hospital staff, who—pardon the eastern expression—"want to be shown." The more the rest of a hospital staff gets mixed up in the prescribing and running of a department of physical therapy—provided the director knows and is on his job—the better the results obtained.

Dr. Kime tells us of the wonderful team work he has in his hospital, where even the house staff and the resident chip in their ideas in prescribing physical therapy. That is where you men in the west jump ahead of us in the east. The internes we have are so filled with their own ultra modern ideas of therapeutics, or else, as I am sorry to say, are so over-enthusiastic to make a fancy diagnosis and do not care how the patient is treated, that it is almost unbelievable to think they would come near a department of physical therapy except to sneak down at night and sunburn their scalps with ultra violet, trying to stop their hair falling out.

The visiting staffs of most eastern hospitals are extremely careful about taking any kind of stand concerning physical therapy. Most of the older visitings not only do not believe anything can improve or quicken their results but are afraid to let some one attempt to help them. I have addressed the attending and house staffs of a great many hospitals in and about New York, and I have always found that the younger men are the only ones who ask questions and show an interest in my lecture. Some of the older men ask fool questions and try to catch you and find out how little you might know of their specialty. Of course the older men who really are up-to-date and progressive show up in such staff meetings.

When medical students get to their fourth year they have a lot of clinic and ward work and are getting more each day. I have noticed in teaching the fourth year students at Columbia that the sections that come to me at the end of the year in the optional course I give, are of larger numbers than at the beginning of the year. This I feel is due to the fact that when graduation nears, the fourth year men begin to think out therapeutics for themselves. They have heard of physical therapy and realize that most hospital treatments are not complete and perfect. Therefore, they want to know what physical therapy can do. I am pleased to say that many internes, former students of mine in Columbia, have shown a very gratifying interest in the Department of Physical Therapy of a hospital with which I am connected.

Dr. Kime is fortunate in convincing the faculty of the medical school he is connected with that physical therapy is a part of the "triad of Medicine." The proof of his success is the amount of time they allot to him, the making of it a required course and the permission to give an examination. Such a course is what all of us who teach physical therapy look forward to giving. In Columbia, physical therapy is under the surgical department, for it and the medical department are the only two in the school of medicine. Many medical schools have a department of therapeutics and that is where physical therapy should come. I must say, however, that the surgical department of Columbia is most co-operative; and embracing physical therapy to itself is only typical of its progressiveness.

When I began to teach physical therapy at Columbia four years ago, it was particularly hard to start out, for I had no modern courses to "crib" from. Now over twenty medical schools are teaching modern physical therapy, and many more are taking it up each year. When Columbia moves to the medical center next spring, I hope that by the time of this meeting next year I can have some distinct, marked progress to report to you. More post graduate courses will be given and teaching, I hope, will be extended to others than medical men. We who teach should begin to pay more attention to real instruction of technicians and

not see them bled by so-called schools which only get them because of their altruistic enthusiasm.

Three great things are needed to advance the teaching of physical therapy. First of all is a standardized nomenclature. I understand that the Council of Physical Therapy of the American Medical Association is working on this problem. I realize that I am in Chicago, but I cannot help thinking that before a nomenclature is adopted by the Council, it should be submitted to this college and especially to the teachers of this college for endorsement and criticism. I mention teachers especially for the average run of clinicians who do not have to watch their steps in talking, say anything that comes into their minds and do not *care* whether they are in step with the army or not. Look at the literature now published on physical therapy and see in what mixup the terminology is today. The reason why I think a nomenclature should be submitted by the Council of the American Medical Association to this college is because we are all clinicians whether we teach or not, and as far as I know such are not well represented on the Council of the American Medical Association.

The second need to advance the teaching of physical therapy is a branch association of this College of Physical Therapy corresponding to the Association of American Medical Colleges, which is composed entirely of teachers of medicine. Such a section of this college could meet in the summer just before the medical schools open and make out what is the most ideal

course for hours allotted. Correct instruction of medical students is the firmest foundation upon which real true physical therapy can grow.

The third fundamental for the advancement of physical therapy, especially in schools and clinics which Dr. Kime's paper deals with, is research, both laboratory and clinical. A committee of this college, working through and with the teachers could make contacts with all the departments of physics, physiology and metabolism in medical schools of the country and awake an interest in the research problems that would be beneficial to the whole subject of physical therapy and emphasize what is good in it. Such research would also expose the fallacies that have been handed down from those dark days when physical therapy was floating around in the realm of empiricism.

Many of you here are unable to do any teaching in an organization. Do not forget that each one who keeps accurate records is adding a brick to the foundations of real physical therapy. We cannot be criticised as the earlier workers are today, that their diagnoses were wrong, or that they did not have what we consider modern training. We are first physicians, trained and qualified to practise medicine without even thinking of physical therapy. But since we choose to work a little harder and acquire a knowledge of physical therapy, we must all help to separate the wheat from the chaff, pass on the wheat, (but not stuff it down other doctors' throats) and cultivate that wheat as best we know how, but all the time we must remain sensible physicians.

PHYSIOLOGICAL EFFECTS OF HEAT*

PROFESSOR A. J. CARLSON

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CHICAGO

I will first recall to you some of the facts known of the changes of temperature of isolated organs, such as the nerve, the isolated muscle or the isolated heart. These have to be studied first because when you attempt to apply heat to a complex mechanism such as a dog, rabbit, frog or human being you have so many factors involved that they are difficult to interpret.

Irrespective of whether we take the muscle of a cold-blooded animal like the frog or a warm-blooded animal like the dog or man, if we vary the temperature of the muscle we have paralysis by cold, while below, and above a certain temperature we have paralysis by heat. Above that we have heat coagulation.

Between these limits of temperature we did not reach the activity coming on, such as the contraction of the muscle, the weakening of the heart or conduction in the nerve fiber, or reflex action in the nerve center. Irritability or conductivity is increased in proportion to the increased temperature. A great many physiologists have studied these phenomena and have shown that, in general, isolated organs that can be studied, such as the nerve fiber, the muscle, or the heart, have a temperature coefficient. The acceleration of the processes in these cases by the increasing temperature is, on the whole, of the same order as the acceleration of the process in the beacon by raising the temperature. That is, for every increase of ten degrees Centigrade the increase of activity is two to three times. As the activity is increased the faster the organ functions and continually gets stronger; but it is merely in acceleration of a normal process. So far as we know, nothing new enters into the processes that are accelerated by heat.

A great deal of study has been made on the phenomena of heat paralysis, and I presume it will have some value, particularly in the field of

heat therapy that Dr. Kellogg spoke of, namely, the control of surface pain. It is very likely when one raises the skin temperature to 120 degrees Fahrenheit the heat paralyzes the pain nerve endings. That degree of heat, of course, is impossible to apply to internal pain foci. It would be dangerous to apply because the limit between heat paralysis and heat coagulation is very narrow indeed.

As a matter of fact, Halliburton, years ago, thought when heat has been raised until the muscle, the nerve and the heart is paralyzed, and can no longer act at all, we have there precipitated the protein which has the lowest coagulation temperature. That is one theory of the nature of heat paralysis.

In general, heat coagulation of the protein is irreversible. There is very little evidence in the physiological biochemical literature to show that when any one of the proteins in the living system have once been paralyzed they can be resolved again; but provided you stop at the increment of temperature just at the heat paralyzing point, and do not continue the temperature for too long heat paralysis is quickly recovered. It is easily reversible. For example, it is possible to produce in a nerve heat paralysis three, four or five times in succession, and, by reducing the temperature the nerve can return apparently without injury.

The other suggestion that has been made for the mechanism of heat paralysis is asphyxia. This was proposed a number of years ago by the German physiologist, Winterstein, on the well-known basis that this increase in activity with increasing temperature of the organ involves increased oxidation. According to him, you soon exhaust the available oxygen in the tissues, and, of course, if there is no oxygen there can be no activity.

According to Winterstein, if you submerge an isolated organ in a medium from which you

*Read at the sixth annual meeting of the American Physical Therapy, Chicago, Nov. 1, 1927.

have driven the free oxygen and cover such an organ with oil, you produce heat paralysis at a lower temperature, and you cannot restore the heat paralysis without the oxygen.

Thus there are two views regarding the nature of this phenomenon which comes on before heat coagulation: one, that it is the partial heat coagulation of the protein, and second, that it is a tissue asphyxiation. As a matter of fact, the evidence is not clear that it is either. The process is very much more complicated because as you raise the temperature of the tissue you disturb and alter the whole physical and chemical equilibrium in the tissues. You increase the ionization, and I do not know what it will do to the permeability of the cell.

This is for the nerve, the muscle and the heart muscle and nerve center studied reflexively. We have little or no evidence bearing on this point with regards to the glands. Certainly we do not, so far as my experience goes, increase the secretion of saliva by warming the salivary glands, directly or indirectly by fever following protein or bacterial agents.

I took the problem up years ago in connection with gastric secretion. I found in the experimental animal that when you raised the body temperature of the dog to 103, 104 or 105, in proportion to the rise of temperature, you decreased the secretion of gastric juice. The same is true if you do not use these toxic agents. If you do not use the bacteria or bacterial toxins, and merely increase the whole body temperature by putting the animal in a hot box, in proportion as the temperature of the animal's body is raised you decrease the secretion of gastric juice.

I was therefore much interested in the preliminary report of Dr. Kellogg and some of his collaborators on the apparent stimulative action of the gastric glands as judged by the secretion of gastric juice by diathermy directly to the stomach. That has got to be extended and confirmed before I am convinced that it is so. In other words, in the whole field of glandular activity it is not possible to take out the kidney and work with that isolated organ like you do the heart, or the pancreas, or the thyroid, or the bone marrow; hence actual, conclusive experi-

ments on man or beast in that field is going to be more difficult to attain.

It would indeed be very nice to assume that by diathermy through the ends of the long bones we could heat the red bone marrow and accelerate the production of the leukocytes in anemia just as we please. That is a very nice assumption, but nothing to prove it in so far as I know.

The other important point that I want to touch on very briefly is this: As you all know, and as Dr. Kellogg pointed out, the whole body so far as measured by oxidation, that is by CO_2 and the absorption of oxygen, and as ordinarily judged by the so-called basal metabolic rate, behaves with reference to temperature changes like the isolated muscle, the isolated heart or the isolated nerve. It is the old well-known phenomenon of fever: that in proportion to the height of temperature you begin to get heat paralysis; the higher the body temperature the higher the oxidative rate. There is no question about that.

The question I want to raise, and raise in all seriousness, has reference to the assumption of Dr. Kellogg, one of the leaders of physical therapy, that this heightened basal metabolic rate is an index of something favorable. There is nothing known in physiology or biochemistry or, (if I have my finger on the pulse of scientific medicine today) to prove that such heightened basal metabolism is favorable. You see it in fever, but the biology of fever is not known. It is possible, of course, that the heightened metabolism in fever may be an aid in overcoming an effect. We don't know, but certainly the heightened metabolic rate in toxic goiter is no evidence that it is something favorable; it is unfavorable so far as we know.

There is no evidence that this increase in oxidative rate is anything else than the increase of heat production in muscle and nerve, and does not necessarily mean an acceleration of the urine formation, the acceleration of the leukocytes, or the acceleration of immunitive processes. In other words, the reason for therapy of this heightened metabolic rate is absolutely an open question in my judgment.

If you merely want to accelerate the oxidative change, you can do that by work. The

lumber jack, doing hard, muscular work, will have a much higher oxidative rate in twenty-four hours than a person lying on his back with sunlight or lamps. I am not saying it is more advantageous to be a lumber jack in the north woods than to be in a sanatorium. We have got to prove that raising the basal metabolism in a person with a normal basal metabolic rate will help him.

Of course, we assume that where the basal metabolism is lowered, as in serious impairment of the thyroid, raising it might help, but I have yet to see the symptoms of hyperthyroidism being controlled by raising the basal metabolism. You have to raise the very specific agent in the case, by the thyroid hormone.

I admit, of course, that the direct increase in muscle contraction, in muscle irritability and heart action, in nerve conduction by raising the temperature gives a presumptive working hypothesis that will also work for other glands as well. I was correspondingly amazed, therefore, in finding not only that the glands are decreased by increasing the body temperature, but that the alimentary canal is paralyzed in proportion to the increase of the body temperature. In other words, in the intact animal the intact gut behaves differently under increased temperature than the isolated. It is easy to show that the isolated strip can react like the isolated heart or the isolated skeleton muscle; but when you try this simple experiment in the temperature of the whole body you will find the very opposite. Possibly this increase in temperature leads to intact oxidative content or increased efficiency of adrenalin, or by increase of some decreasing agent which counteracts the direct effect of the temperature as seen in the isolated organ.

The effect of warming the skin on the body processes varies, as is well known, with the groups of animals. In so-called cold-blooded animals we find the law as stated here for isolated organs of all kinds. In proportion as you warm this whole animal you increase his activity, activities that have been measured. I repeat, in cold-blooded animals you increase the leukocyte production, you increase the unity processes, you increase the detoxication processes—that is not known—but you do increase the total gases only in proportion to the body temperatures.

In birds and mammals the very opposite is the case. In other words, stimulating the warm nerve endings of the skin reflects to relaxation of muscle—and I presume that is at the bottom of the old heat therapy of a hot water bottle over the abdomen in the case of uterine cramp or gas pains. While we know less about the relaxation of the visceral musculature, under the influence of stimulation, we know absolutely that the skeletal muscles relax. That is, of course, a well-known physiological adjustment: the mechanism by means of which the body attempts to maintain its normal temperature by decreasing the heat production. I do not know of any advantage to any human, in any type of disease, by trying to upset this mechanism.

I was greatly intrigued and interested by this clever device of Dr. Kellogg in trying to overcome this by having a cold stream of air pass over the skin while he applied the heat. I am not sure, and I am sure Dr. Kellogg will not misunderstand me as I express my doubts, about the actual results in such an experiment where you do not warm the skin. We should have better evidence that the shorter heat waves actually go in and do some good, but by alternating warming and cooling you do produce some temporary effect on circulation, possibly on the nervous system.

We must not be dogmatic in this field. It is indeed possible that the light rays which are shorter may penetrate deep enough to affect the capillaries of the skin, and in that way may act differently from the ordinary heat waves we are subject to. But certainly, ladies and gentlemen, that point can never be proven by experiments in which we employ the whole range of the solar spectrum. There we are dealing certainly with a series of rays, part of them invisible, and part of them visible. In an experiment to prove that, we must screen out all of the other known and unknowns as well as control the surface temperature.

Conversely, of course, it is well known that in the warm-blooded animal you do not cool the body by cooling the surface as long as you have not paralyzed the capacity of the animal to produce heat by muscular contraction or glandular activity. The exhaustion that comes with application of cold to the surface is something that

comes after the reaction, and that exhaustion is equivalent to the exhaustion you feel after extreme muscular work merely from the almost complete burning up of the available nitrogen in the muscles and in the liver, although that is pretty much a hypothetical question. Gust, of course, has shown that an hour or two or three in an ice cap renders the liver more active and free than seven days of hard work accompanied by fast. That is merely an illustration of the extreme working of the mechanism striving to maintain what? To maintain a normal temperature.

Of course, the adjustment of the human species, of all mammals, of all birds, to their body temperatures is something that has been developed through eons of time. It is a slow adjustment. We have the mechanisms forever preventing the body from going above that temperature. We have always assumed that when the body goes above this temperature that it is due to a break down of a normal defense. It will, therefore, take a great deal of sound, scientific work, not in one laboratory, not in two, but in many, and the result will have to be pretty uniform to show that the individual is benefited by breaking down in any way this mechanism of defense against this higher temperature, because you do not go very much above it before you can see some injurious effects.

The point I want to touch on briefly is the effect of heat on the capillaries. That is the first deep structure of physiological significance that surface heat will effect. I am not speaking of the effect of the light rays on the skin. We shouldn't confuse light and heat.

We do not know whether dilation is an expression of paralysis of the capillaries. Certainly it is not a normal thing for the capillaries to be dilated. Whether the dilatation of the capillary is merely secondary to increased activity, increased oxidation in the region, we know that through the production of some kind of tissue metabolism there is in the normal individual increased capillary dilation in proportion to the increased activity in the local region. And that seems to be a chemical control due to the production of substances associated with the increased activity. If the dilation of the capillaries in the local heated area is a paralysis, then I doubt that we are doing anything very good, because I am afraid that paralysis will be accompanied by permeability and therefore upset the balance between the blood and the tissue. That does not necessarily mean serious injury. It is remarkable what insults the living organism can be subjected to and still survive.

Before closing, I wish to second the appreciation Dr. Kellogg expressed toward this association because I presume you are organized to bring some little order out of chaos of the present day physical therapy, and I hope that will be accomplished particularly through the newly organized Council of Physical Therapy of the American Medical Association.

There is, unquestionably, something in massage. There is, unquestionably, something in diathermy. But I am also convinced that there isn't all in diathermy that you find claimed in the present day literature, because controls are frequently lacking.

FOCAL IMMUNIZATION IN DISORDERS ARISING FROM FOCAL INFECTIONS*

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The importance of focal infections in the production of pathologic states is becoming increasingly apparent, and no one attempts a cure of such disorders without some attack on the infective foci. Surgical removal of the foci followed by ordinary vaccine therapy, while yielding brilliant results in some instances, fails utterly in others. Suspecting that the failure to cure, in some cases, lay in the inefficacy of the traditional vaccine therapy, I decided to study the possibilities of strictly autogenous immunization in disorders arising from focal infections. A clinical research conducted by myself over a period of two years resulted in the development of such a method of autogenous immunization. This method, which I shall designate as Focal Immunization, consists in using a focus of infection as an immunizing center.

Immunity against a given germ is developed by an interaction of the antigen derived from the germ and the particular cells in the body which are receptive to this antigen. The reticuloendothelial cells present in various organs and tissues of the body and even the ordinary capillary endothelium seem to be the cells principally concerned with the fixation of bacterial antigens, and the development of antibodies.

Focal immunization consists in killing off some of the germs in a focus—setting free antigen—which is absorbed by the receptive cells in the adjoining healthy tissues—which in turn have been rendered accessible to and permeable to this antigen. The death of the germs, the setting free of antigen, and the increased permeability of the surrounding healthy tissue cells, can all be brought about by the irradiation of the focus with ultra violet light. Other physiotherapeutic agents, such as diathermy, may at times act similarly.

The absorption of the released antigen by the surrounding healthy tissues gives rise to a

reaction which culminates in a local tissue immunity and in the production of free antibodies, especially opsonins, which enter the circulation and exert curative systemic effects.

To explain the role of ultra violet light in the immune processes I would venture this as a hypothesis—that areas of irradiated skin or mucous membrane as well as certain deeper antigen binding tissues—become antigen traps or filters, absorbing any circulating antigen that the blood stream brings to them. This concept indicates a rationale for radiating large areas of skin simultaneously with or previous to the irradiation of the focus of infection. Any antigen that escapes the local tissues and enters the circulation is absorbed by the radiated skin and gives rise to additional antibody which reinforces the immune bodies produced about the focus. This hypothetical action of light in increasing permeability of tissue for antigen is comparable to the action of bile in increasing the permeability of the intestinal wall to typhoid antigen, an observation that has led Besredka to a method of immunization against typhoid by the oral route.

The clinical evidence that irradiation of a focus of infection gives rise to local and general immunity, consists in the development of typical vaccine effects, after such irradiation, consisting of the usual negative and positive phases that have been so well described by Wright. These vaccine effects may be used as a guide to the production of a local and general immunity, against the pathogenic germs present in the focus.

PROCEDURE

The procedure involved in the process of focal immunization can best be described by taking a concrete example. Let us suppose that a patient presents himself with an obscure pathologic state that appears to be a consequence of some undemonstrated focal infection.

First the guilty focus must be found. One proceeds by testing out with the mercury arc

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lamp, plus quartz compression—one possible focus after another—noting carefully the local and systemic reactions that ensue. The focus that gives rise to a positive vaccine effect, comprising negative and positive phases, is suspected of being an etiologic factor in the production of the disease presented by the patient.

The foci giving rise to such vaccine effects are then treated with progressive doses of light until no further local or systemic reaction takes place. About this time, we may, and often do find, a great improvement, if not a cure, of the pathologic condition complained of. Such a favorable therapeutic effect following irradiation of a suspected focus would corroborate the implication of this focus as a causal factor.

The intervals between treatments are so timed that each succeeding treatment is applied just before the complete subsidence of the reaction occasioned by the previous one—about four days apart as a rule. The light is employed cautiously, in very small doses at first, so as not to cause too violent a reaction.

Anaphylactic phenomena occasioned by the absorption of denatured body and bacterial proteins at the site of the infected focus are also remedied by the ultra violet light through a desensitizing process.

The depth at which the application of ultra violet light—say from the mercury arc lamp—will act on tissues so as to render them permeable to antigens, is, I believe, considerable. The visible light probably plays a large part in this deep action. At any rate I have been able to treat frontal sinusitis successfully by applying the mercury arc lamp with quartz compression to the outside of the sinuses, i. e., over the skin.

The gallbladder and other deep-seated organs, in favorable cases, have shown a definite and favorable response to external light treatment, using compression, of course.

The curative effect of ultra violet light in tuberculous peritonitis and tuberculous retroperitoneal glands can also be explained by deep action, which increases the permeability of the deep receptive cells to the tuberculous antigen present.

In the case of the air cooled lamp it is probably a combination of the infra red, visible and ultra violet light, operating on the deeper skin structures that renders the receptive cells more permeable to antigen.

SOURCES OF ANTIGEN

There are three great fields of germ antigen in the body that are available for the purpose of specific autogenous immunization:

1. The first is comprised by the mouth—pharynx, nasopharynx and sinuses.
2. The second by the abdominal structures
3. The third by the pelvic structures.

To be more explicit: Antigen for focal immunization may be derived from the ultra violet radiation of the various structures of the mouth, pharynx, and nasopharynx. That is, tonsils, tongue, gums, mucous membrane of the mouth in general, pharynx, nasopharynx, nasal mucous membrane and sinuses. The ears and mastoid region—may furnish antigen if infected. The larynx, trachea, bronchi and lungs could probably be reached by deep radiation with compression. The pelvic structures can readily supply antigen through radiation of the vagina—cervix—tubes and ovaries, prostate, seminal vesicles—urethra and bladder.

In the abdomen the gall bladder, colon, especially the coecum, the duodenum and ilium, by external radiation may serve to give vaccine effects. The internal radiation of the rectum, however, is the most practical method of delivering into the system antigens derived from pathogenic intestinal bacteria.

It is conceivable that the absorption of food proteins by the rectal mucosa with consequent desensitization would also be favored by irradiation of the rectal mucosa in cases suffering from anaphylactic disorders of intestinal origin.

TYPES OF REACTIONS OBSERVED DURING FOCAL IMMUNIZATION

The types of systemic ultra violet reactions encountered in the treatment of foci of infection are varied, but may be comprised largely under the following headings. It is understood, of

course, that certain types of these reactions may and usually do occur simultaneously in the same patient:

1. Febrile reaction, with chills, fever, and general aching.
2. Toxic reaction, shown by headache, nausea and malaise.
3. Rheumatic reaction, general aching, muscular rigidity, painful nerves, painful or swollen joints, acidosis.
4. Fermentative reaction, development of considerable intestinal tympanites—a negative phase reaction frequently encountered after treatment of tonsils or rectal mucosa.
5. Narcotic reaction, great sleepiness after eating, usually coupled with fermentative reaction and probably due to absorption of fermentation products belonging to the alcohol group.
6. Oedematous reaction, due to acidosis or to absorption of toxic intestinal products, e. g. histamine, coupled with anaphylaxis. This type of reaction is frequently encountered.
7. Tachycardic reaction, seen in cardiopathic cases, hyperthyroid cases and cases of effort syndrome.
8. Anaphylactic reactions, asthma, urticaria, general oedema and itching.
9. Special sense disturbance. Blurring of vision, tinnitus aurium.
10. Neurasthenic reaction, great nervous exhaustion, great prostration, patient feels as though he has been knocked on the head.

In addition to its curative value, the method of focal immunization promises to be of service as an instrument of investigation into the etiology of many obscure diseases suspected of being the results of focal infection. Many of the anemias, especially of the pernicious type, a number of gastrointestinal diseases, including ulcer, certain of the cardiopathies, certain arterial diseases, certain diseases of the endocrin glands such as hyperthyroidism and diabetes, some inflammatory as well as certain degenerative diseases of the nervous system—these and other disorders of obscure etiology—could profitably be studied in relationship to such focal infections as may be presented in individuals suffering from any of the above mentioned diseases. Interest-

ing and instructive observations might accrue from such a study.

The method of focal immunization helps us to fix the guilt or innocence of a given focus as an etiologic factor in systemic disorders.

As an aid to establish the presence or absence of a focal infection in a suspected organ or tissue structure, for instance, the tissues surrounding the apex of a tooth, the reactions developed by light treatment serve excellently.

Also, as a method of sterilizing a focal infection as a preliminary to its surgical eradication ultra violet radiation is of great value. The tissues surrounding the focus, as well as the system at large, become so thoroughly immunized as to greatly diminish the possibility of dangerous consequences in the event that bacterial embolism should occur during the extraction or ablation of the infected focus.

THE PROPHYLACTIC USE OF FOCAL IMMUNIZATION

The prophylactic use of the method of focal immunization opens up an important field of disease prevention.

Many of the acute and chronic diseases, especially the disabling and degenerative diseases that plague our old age, arise from infection with germs that normally habituate the mucous membrane and the skin. By employing the methods of focal immunization in healthy children and adults, a prophylactic immunity could be established against germs of pathogenic potentialities which we continually harbor within ourselves. While an active immunizing campaign is being waged against the accidental diseases, such as diphtheria, scarlet fever, smallpox, typhoid and paratyphoid, cholera, bubonic plague, why should we not do as much in the immunization against the staphylococcus, streptococcus, pneumococcus, colon bacillus, etc., which are responsible for so much pathology in the human race?

AUTOGENOUS IMMUNIZATION IN ACUTE, SUB-ACUTE AND CHRONIC INFECTIONS PRODUCED BY GERMS THAT ARE DIFFICULT TO CULTURE

In those systemic diseases arising focally from germs that are difficult to culture, the pro-

duction of an autogenous vaccine for therapeutic purposes is impracticable. Poliomyelitis, meningitis, encephalitis and other diseases of the nasal and sinus origin may be mentioned as examples. I would suggest that the antigen for immunization in these diseases might very possibly be derived from ultra violet radiation of the nasal mucous membrane, sinuses, and perhaps the tonsils and mouth structures. A cautious test of focal immunization in appropriate cases of these infections of the central nervous system might reveal very favorable therapeutic reactions.

Encephalitis, which is probably a chronic progressive infection, would serve excellently as a disease for experiment along these lines, especially in the subacute stage. The antigen could be derived as in poliomyelitis and meningitis by radiating the nose, accessory sinuses, nasopharynx, tonsils and mouth structures.

Since the use of Rosenow's streptococcus vaccine has given good results in some cases of encephalitis, focal immunization by which an autogenous vaccine can be prepared in situ should offer some promise of success.

Are the principles of focal immunization adaptable to the case of syphilitic infection?

Lues is in its incipency essentially a focal disease, a local spirochetal infection. Whether the systemic immunity toward syphilis could be influenced by ultra violet treatment of initial or late lesions is, I think, an important problem that might very well repay investigation.

At this point I would like to restate and amplify the hypothesis that I brought forth in the beginning of the paper—to the effect that an irradiated mucous membrane or skin, and even certain deeper tissues, through the increased permeability produced by light, becomes powerfully absorbent for antigens of various types.

Antigens circulating in the blood are absorbed by such radiated skins or mucous membranes and consequently diverted from those localities or tissues that previously had shown an affinity for their antigens. This hypothesis

of antigen diversion accounts in part for the desensitizing action of ultra violet light in allergic cases. It also accounts in part for the improvement in secondary foci of infection after general or body radiation.

The immunizing effect of protein shock therapy in infections, may likewise be explained by an injury to the cells of the body produced by the chemical changes following the injection of the foreign protein. This injury increases the permeability of the body cells to any germ antigen that happens to be circulating in the blood. The interaction of these protein shocked cells with the germ antigens could readily account for the specific immunity that develops after foreign protein therapy.

These theoretical considerations deserve an experimental test of their validity. Desensitization against allergens of all sorts, e.g. pollen toxins or food proteins, as well as immunization against germ toxins, should be attempted experimentally by preliminary raying of appropriate mucous membranes and secondary application of the respective antigens. Preliminary raying of the skin, followed by intracutaneous or subcutaneous injections of vaccines within the rayed area, or possibly by topical application of germ or other antigens, suspended or dissolved in proper vehicles should be tried.

In conclusion, may I remind you that all infections are due to loss of immunity; that every cure of an infection must take place through restoration of this immunity.

Since most of the ailments to which the human body is subject are due to infections, we have a great reason to believe that the work of medicine in the future will lie principally along the lines of immunization against infections—especially prophylactic immunization.

The role of physiotherapy in the production of bacteriologic resistance is assuming a position of importance which I feel sure will be enhanced as our working knowledge of physiotherapeutic modalities increases.

DIATHERMY IN CANCER THERAPY*

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In considering the status of diathermy in the cancer problem I shall not enter into the discussion of its direct therapeutic advantages. This side of the question is elucidated by competent men in the course of this meeting. I will attempt to consider diathermy in its influence on our mental attitude toward the whole topic of malignancy. I venture to state the introduction of diathermy into cancer therapy furnished one of the mightiest impulses toward heading our reasoning in a progressive direction.

The analysis of the clinical effects of diathermy opened up new avenues of thought not only concerning therapy but also the etiology of cancer.

As two prominent working points I will quote remote results after partial diathermic destruction of malignant tumors, and the influence of diathermic destruction on the general condition of patients suffering from malignancy. Observations in this direction helped us to see other clinical and biological facts in a new light.

One of the most instructive experiences is gleaned by the study of the clinical course of malignant tumors of the urinary bladder after electrocoagulation.

In the majority of such cases there are technical obstacles preventing a complete diathermic destruction of the tumors. Such a procedure would lead to a perforation into adjacent organs either immediately or by subsequent sloughing.

In spite of that fact definite results may be obtained that excel those furnished by any other surgical method. Similar experiences are reported in coagulating malignant tumors of the tongue, the uterus and pharynx, tumors that

had to be considered inoperable according to our former views.

It was also observed that in patients in whom a complete destruction of malignant tumors in one seance was not considered advisable and in instances of recurrence, each diathermic session was followed by a marked improvement of the general condition lasting for quite a while, even if no definite local cure was obtained.

It was also noticed that raying following electrocoagulation seems to be therapeutically more efficient, especially in preventing recurrences, than if applied without any preceding diathermy.

It was also observed that following surgical diathermy around the area of coagulation there is created a zone of intense and characteristic reaction. Numerous leucocytes, round cells and fibroblasts appear in this zone which also shows pronounced hyperemia. That this zone is a field of cellular activation is evidenced by the results of intravital staining.

A collective consideration of all these items leads to the conclusion that the reaction excited by diathermy is apt to mobilize or at least to re-enforce defensive agencies within the body. Once the attention was focused on the scope of the innate somatic forces it naturally followed that the etiology of malignant tumors was considered from this point of view.

It is evident that within the body there goes on all the time a struggle between stimulating and regulating forces. This accounts for developing of certain organs at certain periods of life and for the limitation of their growth to the norm. It is also known that there is a reciprocity of specific influences among certain cell groups—the emanation of certain complexes acting only on special other complexes. An example of a disturbance of the balance between

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these forces is the excessive growth of some bodily parts as in acromegaly. There is no evidence available for the suggestion that cancer is produced by the invasion of the body by pathogenic germs. There is also no reason for denying that cancer cells are subject to the same biologic and physiologic laws governing other bodily structures, among them the relation between stimulation and regulation. The cancer cells are biologically characterized by quick maturing and decay, unlimited proliferation and subsequent invasion of adjacent structures.

It may therefore be surmised that the formation of cancer is due to the disturbance of the equilibrium between stimulating and regulating forces, finding its local expression in tissues that are inclined toward instability, this condition occasionally being fostered by other influences such as constant irritation. This conception will explain the frequency of cancers occurring in certain organs under well known chemical influences such as the vesical cancers in people working in anilin factories and the cancer of the lungs in cobalt miners. It will also explain the predominance of cancers in the narrows of the intestinal tract, where the abundant desquamation of the epithelial covering may favor a further disturbance of the equilibrium between stimulation and regulation.

That the general constitution of the individual is a great factor in cancer is evidenced by the fact that only a certain number of individuals exposed to the noxae mentioned develop cancer, the others remain cancer free. This constitutional influence is also demonstrated by another observation. During pregnancy with its upheaval of all somatic functions, instances were observed where pre-existing cancers showed rapid growth, but also instances where pronounced retardation was noticed. It is also known that in very small cancers detected early, extensive operations failed to obtain a cure, while in other instances extensive cancers apparently giving a poor prognosis were definitely abolished by surgery.

That defensive forces exist within the body is proven by clinical experiences. In every cancer retrogressive changes are to be found, such as necrosis and keratosis. These have to

be looked upon as nature's attempt to destroy the cancer. That physiologic changes within cancer cells meet with a systemic response is made plausible by another observation. If the cellular construction of a cancer is materially changed by an extraneous local influence such as radiation, numerous eosinophile cells appear in the adjacent structures. Some authors consider this occurrence as indicative of therapeutic success, a favorable prognostic symptom. There are cases on record in which at the occasion of extirpating the growth numerous cancerous lymph glands were removed and a definite cure was obtained. It is hard to believe that by the operative procedure all the lymphatic tissue infested with cancer cells was removed. If in spite of that the patient remained well we again have to assume that the natural defensive agencies of the body took care of the remaining disseminated cancer cells.

If a patient suffering from cancerous cachexia is transfused with the blood taken from another cancer carrier whose tumor was irritated by chemical or physical means, the recipient after each transfusion will show marked temporary amelioration of his symptoms. It is reasonable to assume that defensive ferments mobilized in the donor by their transfer to the recipient exerted a favorable influence. This assumption is also supported by examples taken from the radiologic practice. In amenable cases of multiple lympho-sarcomata the raying of one single tumor suffices to bring about the disappearance of all the tumors—this can only be explained by the mobilizing of general defensive agencies. There are also cases on record in which after raying of a malignant tumor it subsided and its site became occupied by cells normally belonging to this region. If direct destruction of the tumor cells were responsible for the cure, cicatrization would have taken place. A true metaplasia of cells can only be explained by the influence of regulating ferments.

It is obvious that even the most successful local operation alone is unable to furnish a guarantee against recurrence. Even if one would succeed in removing all the cancer cells present at this particular time, a reformation of malign-

nant cells cannot be prevented unless the producing forces are successfully dealt with.

Arguing from all these items I submit that cancer even in its earliest stages cannot be considered a local disease—it is only the local expression of a general disorder. The production of cancer does not depend upon some hostile invasion of the body; it is due to functional disturbances; it is an endosomatic affair or if the expression is permissible it is a domestic proposition of the human body. The therapeutic efforts must not only be directed towards the malignant tumor proper, but must also be pointed toward the mobilization and re-enforcement of the natural defensive agencies.

For such a rational therapy surgical diathermy furnishes excellent opportunities. In consideration must be taken not only its technical advantages, that in a great many instances surpass the knife, especially since the diathermic technique was developed and refined by modern efforts as exemplified in the admirable work done by men like Wyeth, Clark, and Ward. Special attention must be paid to the perithermic zone developing around the place of electrocoagulation. It is not too far fetched to assume that in this area of vitalistic stimulation materials are produced which on entering the circulation may excite the endocrine system to produce defensive and regulating ferments which

after arriving at the site of malignancy will restore normal conditions.

It will be the task of the biologists to determine and to isolate the compounds carrying these defensive and regulating ferments so that they may be reproduced at wish. That will lead up to a true chemotherapy, that is the arrival of these compounds at the place of destination will put an end to the riotous life of the malignant cells; the balance between stimulation and regulation will be restored and normal structures will take the place of the malignant tumor.

The local and general reaction produced by surgical diathermy is a fruitful source for the material for such investigations. For the carrying on of such research work the establishing of cancer centers is indispensable, specialistic hospitalization of the cancer patients is necessary. But even if the profession should be fortunate enough to reach the ideal of chemotherapy, so that we will be in a position to treat and heal cancer without any local destruction it never will be forgotten that surgical diathermy was a stepping stone. At the present time surgical diathermy should be extensively employed in cancer therapy, but always with the outlook on the ideal goal: cure without mutilation and without recurrence.

BASIC CONSIDERATIONS OF THE CARBON ARC AND FLAME LAMPS IN MEDICINE AND SURGERY*

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Early electrical experimenters learned that if two carbon rods were connected in an electrical circuit, and the circuit was closed by touching the tips of these rods together, upon separating the carbons, the current continued to flow across the gap, forming an arc which produced light. Sir Humphry Davy demonstrated this phenomenon for the first time on a large scale in 1813. Davy used a battery of 2000 cells, and produced an arc between charcoal points four inches apart.

Nils Finsen was the first to utilize the voltaic arc in medicine. The first apparatus used was a carbon arc of 35 to 50 amperes. The upper carbon was of larger diameter than the lower. Only direct current could be used. The source of the light was the crater, hence, Finsen-therapy implies a crater arc. It should be noted for its historical significance, that the first apparatus of Finsen included glass lenses. These were dispensed with later, and quartz lenses substituted.

Advances in construction of the carbon arc apparatus were made. Finsen modified his apparatus; Reyn made less bulky models; other workers made their own apparatus.

The early work was done with high amperage; direct current, and crater arcs were used, mainly because there were no others. In a short paper, such as this, it is not possible to go further into the history of the carbon arc and flame lamp, as applied to medicine and surgery. It should be noted that for a number of years, carbon arc and flame lamps were not very popular. With recent improvements in the construction of lamps, and in the manufacture of cored, impregnated carbon electrodes, there has been a decided renewal of interest in the carbon arc and more particularly the carbon flame lamps as a source of radiation in medicine and surgery.

The carbon arc, but more effectively, the carbon flame lamp, has certain features of espe-

cial value to the physician and surgeon. The emission characteristics are controlled by the amperage; the relation between the amperage and the cross section diameter of the carbon electrode employed; and the type of carbon electrode. The carbon flame lamp reaches efficiency in a few seconds after ignition. The factors are practically constant, and the emission can be duplicated by using the same factors as amperage, cross section diameter of electrodes, and the same carbon electrode whether cored or impregnated.

At the present time there is great enthusiasm in what I have called "prescription carbons." By impregnating the carbon material with certain metals and salts, emission characteristics can be secured which result in various zones of light being more richly emitted. Thus if one wanted the patient to secure a relatively broad and rich emission in the long wave ultra violet, it would only be necessary to so inform the electrode manufacturer, and the proper electrode for this emission would be secured. If, on the other hand, the doctor wanted more radiation from the short wave length ultra violet, this request would bring another type of cored carbon electrode. So in time, with the factors recorded, we would be in a position of prescribing light, both from the visible and the ultra violet with more than empiricism. The term "light" is a very broad term. Its use unmodified, is apt to cause confusion. The term "ultra violet light" is not without its pitfalls, because the ultra violet is a broad consideration, including as it does all the wave lengths, shorter than the violet of the visible spectrum. Thus we have short wave ultra violet, medium wave ultra violet, and long wave ultra violet. Each of these zones is very different from the others. The physical properties and the physiological response of each of these zones is different also. The patient who is exposed to radiation of ultra violet, with the predominating wave length in the one wave length ultra violet gives a very different physiological

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response than the same patient, exposed to ultra violet of another wave predominating.

I am satisfied that there is a specificity in human and animal responses to radiation of particular wave length or frequencies. In our present sources of clinical ultra violet sources we cannot separate these wave lengths. Hence the following divisions are of some value, particularly, if we consider the solar source.

Intravital ultraviolet—3900 to 3200 Angstrom units.

Vital ultra violet—3200 to 2900 Angstrom units.

Extravital ultra violet—2900 and below.

The limits were set because 3900 Angstrom units is the division between visible and ultra violet; 3200 Angstrom units is the conventional limit for ordinary glass; and 2900 Angstrom units is the limit of ordinary sunlight in summer. Vital ultra violet is the zone in sunlight which is necessary for the normal growth of babies. It is the zone which sunburns and suntans, and which affects the calcium metabolism of pregnant women. Various carbon electrodes are designed to permit control of the emission of this zone.

Another feature of the carbon flame lamp is that it gives a varied proportion of visible light, the ultra violet, and the infra red. As a matter of actual fact, every light emanator, whether it be a match, a candle, a mercury arc in quartz, or a carbon electrode, gives varying proportions of these parts of the spectrum. According to the type of electrode employed, the amperage and the relation between the amperage and the cross section of the electrode, the carbon flame lamp gives off infra red, visible light, and ultra violet. The advantage of the carbon flame lamp is that with the same factors operating, the emission characteristics are constant.

The presence of the infra red is held to be of particular advantage. Nearly all users of the ultra violet recognize that the explanation of its efficacy on the theory of penetration is indeed difficult. Hence, most physiotherapists have been in the habit of exposing their patients to sources of infra red prior to the exposure to the

ultra violet sources because they desired a widening of the surface blood bed, which occurred when the heat of the infra red brought a dilatation of the surface capillaries.

The modern carbon flame lamp may be operated on either direct or alternating current in therapeutics. Although the visible zone of light may not be as bright, and although for photographic purposes, especially with the moving picture camera, or with the focal plane shutter camera, flame lamps on alternating currents are not desirable, for the doctor alternating or direct current may be used. On the whole, most lamps may be operated on either or both. This does not apply to the "high intensity" lamps, at least not those already on the market.

The carbon flame lamps may be secured to operate on almost any amperage from 8 to 120. I am using carbon flame lamps which take both these amperages, and other lamps which are rated at 25 amperes, and also 35 amperes.

Some of the lamps are so constructed that the amperage may be either $12\frac{1}{2}$ or 25, or 15 or 30 amperes. One of my lamps may be operated at from 60 amperes, by 5-ampere steps to 125 amperes.

As far as can be determined at the present time, the advantage lies with the higher amperages. A lamp at 50 amperes gives more than two and one-half times the emission of a lamp at 20 amperes. All other conditions remaining equal, the light of the carbon flame lamp varies with the square of the current density at the electrodes. Doubling the amperage with the same carbons of the same diameter would produce four times the emission.

The heating effect of the carbon lamp is the product (in amperes) squared, times the resistance.

The temperature of the positive carbon in the flame lamp is about 3700 C. at its crater. The larger the operating amperage, the more the heat. From a point source, the law of the inverse squares is applicable, as far as the light from the distance from the source is concerned.

If the ratio of cross section of the carbon to the amperage is not the proper one for the opera-

tion of the lamp, we have inefficiency. If the cross section diameter is too small for the amperage used, the carbons spindle; that is, sharpen down as a pencil point. If the amperage is too low for the cross section diameter of the carbon electrode employed in the ordinary low intensity lamps of from 4 to 40 amperes we do not get the advantage of the consumed current.

For the carbon flame lamps we are using cored electrodes. A 6 mm. carbon is used with an 8 ampere lamp; a 10 mm. carbon with 18 amperes, and the 13 mm. carbon with the 25 amperes. The high intensity lamps have revolving carbons.

There is another consideration which has to do with the amperage. The higher the amperage the greater the heat. The more the heat, the lower in the ultra violet does the radiation come. Thus the sun, which has an estimated temperature of 5000 to 6000 absolute, is considered to give off radiation as low as 900 Angstrom units. Of course, this short wave ultra violet does not reach this earth because the shorter waves are filtered out by the upper reaches of the distance between the sun and this earth. At the best condition, at mountain tops, on clear days, the lowest radiation to reach this earth is 2912 Angstrom units. In the city, the limits are higher because of the dust, the smoke, and the soot. At the sea shore, on deserts, on snow fields, there is another factor, that of the reflectivity of the silicon and the snow.

It has probably been noted that we have distinguished the carbon arc from the carbon flame lamp. The carbon arc depended in great measure on the crater as its source of radiation. The flame lamp depends on the flame which is produced by the gases evolved from the passage of the current.

The ash from modern lamps operating under proper conditions of amperage and cross section diameter of the carbon electrodes is very inconsiderable.

The carbons used for illumination purposes, namely, the white flame carbon, gives off about 1/20 of one per cent ash. This consists chiefly of iron, silica, alumina, and a lesser amount of calcium material. Some carbons which have

been impregnated with less volatile materials discharge hot sparks. If such carbon electrodes are used, the patient must be protected by the interposition of a wire mesh. This may cut down the quantity, but not the quality of the radiation.

Ordinary window glass interposed cuts off all the valuable ultra violet, as window glass is impervious to rays less than 3200 Angstrom units. Quartz windows would make excellent screens, but the cost is prohibitive. There are special glasses on the market and also in the experimental stage which could be used. One must not depend on the qualitative spectograms in this connection, but must receive from the manufacturers definite proof of the volume passage of the rays.

This has brought us to the consideration of goggles for those exposed to brilliant visible illumination, and also to the ultra violet. Each person who comes within the range of brilliant visible light should be protected by goggles, because although no other injury may result, the unusual brilliance of the carbon flame lamp rapidly tires the eyes. Sources of ultra violet should be guarded also. No permanent injury may result from failure to observe precautions, but the effect is painful.

The patients are exposed to the carbon flame or arc lamp according to the degree of natural pigmentation, state of body temperature, and amount of previous exposure to light sources. The factors given above as the amperage, heat production, wave length limits, and laws for distance from the source, and the type of impregnated electrode, must be taken into consideration from each patient. General exposures are more desirable than local exposures. The physician must decide from his knowledge of the pathology, or state of physiology of his patient, how, when and where his radiations should take place. In addition, the physician should remember that, although light radiation in the therapeutic zones of infra red, visible light and ultra violet is valuable, extremely helpful, in one or two instances practically a specific, yet there are other tools in his armamentarium.

18 East 89th street.

DISEASED TONSILS, THE EVOLUTION OF THEIR TREATMENT*

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When we speak of diseased tonsils, I wonder if we understand or wish to imply that there is such a thing as a healthy tonsil. In other words, do we understand that the tissue of the tonsil may be healthy as well as diseased? There are various ideas, we may say theories, on this subject, and probably it may not be amiss to consider some of these theories before taking up the question of treatment of these structures.

One theory is that the tonsil produces an internal secretion which probably has some useful purpose and is necessary to the health of the body as a whole. However, to my knowledge, nobody has ever proved in the laboratory or clinically, that such secretion exists.

Another theory is that tonsils act as filters and protect the body from invasion of infectious materials or organisms which might be productive of local or general diseases. As the tonsils are viewed at the time of operation, we find them full of holes, and these holes full of pus or cheesy material; in other words, nothing more or less than cesspools of corruption. Furthermore, in the presence of such a condition of tonsillar tissue we may very often find that the cervical glands are swollen; sometimes the swelling is small, sometimes large, and tumefaction has developed to such a degree that we have well-defined abscess cavities in the glands of the neck.

Now it seems to me, if the tonsils were acting as filters, the spread of infection would be stopped in the tonsil and not reach the glands of the neck. Furthermore, even in the absence of glands of the neck, we find a variety of local and systemic manifestations of toxemia which are very frequently directly traceable to the tonsils. This is evidenced by the quick clearing up of these infectious manifestations after the tonsils have been removed. It seems to me that instead

of being filters, the tonsils act as open portals of infection through which bacteria reach near and remote parts of the body by way of the cervical lymph channels.

A third theory implies that the tonsils are broken down lymph glands. In support of this theory it has been shown under the microscope that the tissue of the structures which we find in the faucial spaces, the tissue which we find in the naso-pharyngeal spaces, the tissue which we find at the base of the tongue, and the tissue which we find in the cervical glands in all lymphoid tissue. The identity of the tissue in the faucial tonsils, in the naso-pharyngeal tonsil or adenoid, and in the lingual tonsil was established by Waldeyer, and since that time, these tissues have been grouped and identified as the tonsillar ring of Waldeyer, bearing the name of him who made the discovery.

This theory of which I am now speaking simply goes one step further and establishes the similarity between the tissues of the cervical lymph glands and the tissues which are found in Waldeyer's ring. The reason for the presence of the faucial tonsil is explained by assuming that the cervical glands in the neighborhood of the faucial spaces become enlarged when inflamed, and as a result of this enlargement, break through at the point of least resistance which is on the oral aspect. The anterior, posterior and external sides of their capsule are guarded by structures of the throat and neck. This, to me, seems to be the most reasonable theory of those which to date have been advanced because of the marked histological analogy existing in the various structures which have been mentioned. The mechanical explanation of the rupture of the capsule also appeals to me. However, it is not my purpose to ask you to accept any one of the theories enumerated, but I have never yet seen a tonsil which I considered healthy, and I have never seen the human economy suffer from the removal of tonsils.

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Now coming to the treatment of tonsils: I am supposed to speak to you in regard to the various methods, including surgery, radium and electricity. I am inclined to divide these cases of tonsils which need treatment into two classes. The surgically fit and the surgically unfit.

I have said that I desire to classify the tonsils which needed treatment, and by that I mean tonsils which are causing some local or systemic disturbances in the patient. Because a tonsil is present is no reason why it should be removed. If it is not interfering in any way with the health of the patient, I don't believe there is any indication for its removal; but if it has to do with the health of the patient, then I believe the tonsil should have attention.

In the class of the surgically fit I should include all cases in which the patient is physically and mentally a good operative risk. You will notice that I have not said anything about age, and I have avoided specifying anything on the age limit because I don't believe there is any limit either up or down if the tonsils are the source of trouble. I have removed tonsils in children as young as six months, and several times in adults between the ages of 65 and 68. I don't believe there is any reason for hesitating on the age question of tonsils any more than there is in the handling of a case of appendicitis. One condition should be considered with the same surgical judgment as the other.

In the class of the surgically unfit we must consider the patients who are not a good physical operative risk. Such cases as hemophilia, arteriosclerosis, questionable chest cases, including heart and lungs, cases of pronounced anemia. Among the cases to be considered as mentally unfit are those who dread the operation because of their fear of hemorrhage, because of their fear of an anesthetic, because of rumors which they have heard of complications and death resulting from tonsil operations. These people simply will not submit to an operation for their tonsils, and other means must be provided for relieving their conditions.

There is another group which may come under this head of mentally unfit and that is the man or woman of business. These people do

not feel that they can give up the time to have an operation on their tonsils. They don't regard it sufficiently urgent to be forced into the operation as if they had an acute appendix or strangulated hernia or an acute gall bladder; but they regard their tonsils more or less in the light of an interval proposition, like an interval appendix which might be done at any time, leaving the date of operation to the choice of the patient.

I believe in the surgical removal of tonsils first, last and always when it is possible to handle them that way, either under a local or a general anesthetic. I prefer a general to a local anesthetic, and ether to gas and oxygen, although I have frequently used gas and oxygen alone for the tonsil operation; it means faster work, but it can be done and the patient makes a very quick and comfortable recovery. I feel, however, that there is a little more ease and comfort for the operator when the anesthetic employed is ether.

Twenty years ago when I first became acquainted with throat work, we used the tonsillotome which was devised by McKenzie, and we followed the tonsillotome with a tonsil punch. Leland at that time had some idea of dissecting the tonsil because he brought out his pair of right and left handed right-angle tonsil knives. With these knives he instructed us to separate the anterior and posterior pillars of the tonsil from the tonsil itself and then to apply the tonsillotome. At a later date we began to use the snare. Before applying the snare to the tonsil it is entirely dissected free from its base, the loop of the snare applied and drawn, freeing the tonsil from its attachment.

The Sleuder and the LaForce instruments have been used with varying degrees of success and popularity. Personally, I am inclined to stick to the snare, because any man who can dissect a tonsil free from its fossa stands a much better chance of getting the whole tonsil than he can with any other instrument.

The LaForce instrument was brought out principally because of its reputed bloodless technique. If a man wants to take the same time in the use of a snare which he does in the application of the LaForce instrument, he will have

almost as little bleeding. The LaForce instrument is not proof against hemorrhage. I have seen bleeding at the time of the removal of tonsils with the LaForce instrument and I have also seen a hemorrhage after the LaForce instrument as severe as any I have ever seen after any instrument on the market.

In cases of large hypertrophied tonsils and tonsils which appear as being pedunculated, the LaForce instrument is ideal. On the other hand, some cases of chronic submerged tonsils which are buried behind the pillars, and others which are tied down by adhesions following peritonsillar and tonsillar abscess, I believe the LaForce instrument is not as successful as dissection followed by the snare. Dissection and snare appeal to me as the best and most thorough method of removing tonsils.

Some time ago, Waring brought out a series of three tubes which he used in the removal of tonsils. I can't condemn or approve Waring's method. I can only say that it appeared to me like a clumsy procedure. On the other hand, I believe Waring's tubes have a place in the treatment of tonsils which Waring has not mentioned. There are many patients who come to the office with a condition which might be classified as a subacute tonsillitis. Examination of the tonsils of these patients reveals that their crypts contain lumps of cheesy material and sometimes a milky or creamy pus, and the patients complain more of articular or muscular pain than of a sore throat. I have found that by connecting Waring's tubes to a vacuum pump and applying the tube to the tonsil that we have a very fine method of evacuating the crypts of the tonsils, and incidentally I want to say that I have seen such general symptoms as muscular and articular pains disappear after the tonsils have been subjected to this type of treatment.

About five years ago I started to use radium in the treatment of tonsils in the eye, ear, nose, and throat department of the Boston City Hospital and continued to do so for about three years. Most of the work I did in the clinic and very little in private practice because radium never won my confidence in the treatment of tonsils. I made some observations which I will give to you, and an outline of what I did and how I did it.

I took the cases as they came to me, some hypertrophied, some of moderate size and some submerged; some with the history of general disturbances which they claimed were due to the tonsils, others in which there had been a series of recurrent attacks of tonsillitis. Some of these patients showed a definite relief of their symptoms, and systemic conditions such as articular and muscular pains disappeared; in addition to this the patient very often offered the information that they felt braced up, improved in health. Whether they felt better because they were relieved of their pain or they were receiving a tonic effect from the radium, I will not venture to say.

Locally it was observed that the tonsils became firm and fibrous, but were not destroyed or removed. The crypts seemed to be obliterated and this I suppose by compression due to the shrinkage of the tonsil. Tonsils which seemed to be masses of crypts full of various materials would close up, the cheesy material disappear, and the patient seemed to be relieved.

Treatment consisted of implanting 25 to 50 mg. of radium contained in two or four needles, each needle holding approximately $12\frac{1}{2}$ mgs., into the tonsil and allowing them to remain there for periods varying from one-half to one hour. I treated one tonsil at a sitting. Each tonsil was treated three or four times at intervals of two weeks.

The use of radium in the treatment of tonsil conditions seemed impractical. It consumed much time and very easily blocked up a busy clinic. The patients never seemed to take kindly to the presence of the needles in their throats for a period lasting from thirty minutes to one hour. Furthermore, all tissues surrounding the tonsils were necessarily subjected to the action of radium since there was no means devised, nor has there been to date, by which the irradiation could be restricted to the tonsil alone. This seemed to me to be a very serious objection to the use of radium in the treatment of tonsils. At the present time, radium would be my last choice in the treatment of tonsils.

Within recent years there have come to our hands agencies which have been extremely helpful in handling the class of cases to which I have referred as surgically unfit. Some men have

talked about treating these cases with ultra violet light. This, to me, means nothing. I don't believe that the ultra violet light in itself and alone, has any power to eliminate the tonsils or their infectious material.

The high frequency current, I believe, makes a strong appeal for use in this field. The whole subject at the present time must be considered in its infancy, and for that very reason there are bound to be a variety of ideas and a multiplicity of technical methods from which eventually we hope something servicable will evolve.

Some men today believe in desiccation. Among those who believe in desiccation are men who have used or are using small flat electrodes, while others do their work with the needle. It seems to me from my observations and from what I have read on the matter, that the needle is fast taking the place of all other electrodes and bids fair to be the universal instrument to be used with the high frequency current in this work. No doubt, if the patient has patience, and the operator doesn't tire, the tonsil may be destroyed finally by the method of desiccation. It impresses me as being rather slow in accomplishing its end, and requires too many visits of the patient to the office before the desired result is obtained. At this stage of the work, I believe that each and every physician must be guided in his methods by his own personal experience, and the most any one of us can do at this time is to express the impressions which have been made upon us in the course of the work we are doing.

To me, electrocoagulation is the one most effective means of utilizing the high frequency current for the destruction of tonsil tissue. More or less rapid progress can be made with this method. It is evident to the operator that there is a substantial destruction of tissue; it is equally evident to the patient that something has been accomplished in his throat. Care must be taken on introducing the needle into the tissue. It is impossible to say that any certain depth should be employed because the operator must be guided by the size of the tonsil and its natural boundaries.

It seems to me that the coagulation of one tonsil at a time is much better for the comfort of the patient than to try to do too much at one sitting as you will if you coagulate both tonsils. Treatment of both tonsils at one sitting strikes me as being a little too much for the patient, the discomfort is too marked, and for that reason I am inclined to wait four days before beginning treatment on the second tonsil. After treatment is started, four-day intervals at the office will mean that each tonsil will be treated once in eight days. The usual slough after coagulation is sufficiently clear at the end of eight days to justify further coagulation of the tonsil. Three rounds would be the average for the gross removal of the tonsil. There may be some few small tips left in the depth of the fossæ; if so, that is where I use desiccation. I frequently finish the treatment, polish it off, as it were, by electrodesiccation.

Dr. F. Peter Herman of West Palm Beach, Florida, demonstrated before the section on otolaryngology at the American Medical Association meeting held in Washington last May, an instrument which seems to me to be the best suggestion of technique with high frequency current which has been offered to date.

He uses a snare of the Beck-Schenk type, engages the tonsil in the loop and then sends a current ranging from 200 to 400 milliamperes through the loop wire. As the current is sent through the wire with the help of a foot switch, the tonsil is separated with practically no hemorrhage. This seems to be the best method in high frequency, in as much as it cleans out the whole tonsil in one operation, whereas the other method of applying the needle electrode to the tonsil requires several attacks.

I am indebted to Dr. F. Peter Herman for his courtesy in forwarding me his manuscript and also giving me the information that he has perfected the technique which is superior to that offered last May.

I do not believe there has yet been perfected an electrothermic technique for the removal of tonsils to which any of us will be willing to subscribe to as being the ideal. I believe that the day will come, when, with the help of the cutting

current, it will be possible to dissect a tonsil with a technique such as is now employed with cold steel. Until that time, I think each and every operator doing throat work should aim at such methods. I believe that the results, local and systemic, obtained from the use of electro-coagulation are just as effective as those obtained by surgical tonsillectomy, and that in the high frequency current we have a very valuable adjunct to surgery in the treatment of diseased tonsils.

DISCUSSION

DR. V. C. STEWART (Woburn, Mass.): There is very little left to say after Dr. Corbett gets through. It is a subject I am particularly interested in. The electrocoagulation methods began to appeal to me some years ago and I have been following up the technic of different men along that line.

Dr. Corbett's reference to the snare idea used with high frequency I saw used in Chicago two years ago by Dr. Hollender. One of his assistants told me they were getting about ten per cent hemorrhages with that. Lately Dr. Hollender said he is getting no hemorrhages with that technic.

I have only done about 500 of these tonsils by electrocoagulation and do not feel yet qualified to speak of my end results. I had an experience a few years ago of a case developing, about a week afterwards, an abscess and I am inclined to think it was due to faulty technic in anesthesia. I have reduced my anesthesia method almost entirely to the use of novocain, first painting the throat over with a strong solution of gilpen, letting them stand for about ten minutes and then using about two c.c. injection of novocain. If I can get the back of the capsule of the tonsil it gives me a complete anesthesia and I would get the loss of current from my needle. In using the solution in the tonsil it is necessary to use a great deal higher current, a little more amperage and you get a considerable charring effect and my current was carried away more rapidly than I could get it. I do not know where my break came unless it was a diathermy needle or it became infected before using it in the throat or carried some infection from the tonsil through into the tissue and came out about a week later. At any rate it was exactly at the point of puncture I used.

I have had some trouble with ear symptoms in a few of the cases following electrocoagulation. They all quiet down in about thirty-six hours. If the patient is worried give him an ice pack.

I have reduced my technic and use just two applications, which I got from Dr. Hillman in Indiana. I watched him work for a few days two years ago. They had reduced it to that and after experimenting I have come to the conclusion that that is about the proper thing to do. They just use Buten

injected into the tonsil tissue, give three punctures with the needle, using about 2600 milliamperes on a short circuit, which gives about 450 milliamperes at the time you press the foot switch. At the end of the month there is very little tonsil tissue left, which they clean up by desiccation. I use more than three punctures because I find that back of the anterior pillar they had quite a ring of tissue which they had not touched with the straight needle. I follow with a rectangular needle and at the end of the month I have very little to do. Ordinarily there is nothing at all to do. If the patient is gagged you can clean up the whole treatment the first time.

I am still strongly in favor of Dr. Corbett's surgical tonsillectomies. I save electrocoagulation entirely for the non-surgical type, for the bad operative risks. I have not done as much surgical work as Dr. Corbett in that line, but it has first choice in my armamentarium for tonsillectomies.

I have had to handle some of our oratorio and grand opera singers who have a strong dislike of having their tonsils removed. I have handled those tonsils entirely by the use of the vacuum tube which I work into the tonsils, into the capsules where I can hold it, and you will be surprised in half a dozen treatments how remarkable the shrinking is. Those people want to keep their tonsils and they do shrink.

My trouble has been in finding a local anesthetic and a method of doing it that will give me control of my patient while I am doing my other work.

DR. GEORGE J. OTT (Boston): I would like to suggest that Dr. Stewart tell the audience a little more about how he arranges the injections and also a little more about the technic of the operation of those men out West.

DR. V. C. STEWART (Woburn, Mass.): I have tried the use of cocain. I used cocain crystals at one time, letting the patient rest a while. That gave me a pretty good anesthetic, but not enough to clean up the tonsil in one treatment. I painted the patient's throat first with a two per cent solution of alyphen. I go on about some of my other work, go back in about ten minutes, swab them again. I use the 3 c.c. capsules with a long, curved needle. With the tongue depressed I insert the point of the needle just anterior to the posterior pillar. Then throw your hand to the right if you are anesthetizing the right tonsil. I withdraw my needle and then do the same thing to the opposite tonsil. By the time you have completed your injection in the opposite tonsil you hitch up your machine to the plate. I use a large plate on the patient's back with a foot switch. Ordinarily I use about 2600 milliamperes on a short circuit, which gives about 450 milliamperes in the tonsil. The tonsil after your anesthesia has been given is throwing out some substance anyhow. The two per cent novocain sort of chokes it up in the throat. Then I change my needle to an insulated right angle needle which I can get into the upper and lower

portion of the tonsil and then come into the lower part and get that out. Then I go to the middle of the tonsil and I am through. I should say you go any where from seven to twelve times to one tonsil, then to the opposite side.

I give all my patients a gargle. I use phenosolven and have seen no hemorrhages yet, except one or two that were sent to me for postoperative hemorrhage.

DR. PHILIP H. GREELEY (Portsmouth, N. H.): I have had a little experience in the treatment of these cases and I believe in any method which gets rid of the tonsil. As a rule we shouldn't tinker much with other methods. To be sure, in treating a singer, possibly the doctor has a good excuse for using a method that does not destroy the tonsils, but I never know and I didn't know before that a tonsil has been of value to a singer, but maybe they are. I am very suspicious of all tonsils. I have removed some that looked perfectly healthy and were small. I am sure most anyone would have said they were all right; one particularly, in a young lady who had an attack of tonsillitis every winter for a number of years. She got by with it, threw it off during the summer and got along. The last winter she came to me for other treatment. I suggested that it might be a good idea to get rid of her tonsils. I told her it might raise her resistance and she might be in better shape for the winter. A number of people said I was unscrupulous in attacking the tonsils. I was pleased to find them full of pus at the base. They were fine looking tonsils. If there is any such thing as a fine looking tonsil, they were.

So I do not believe that anyone can do much damage in getting rid of tonsils in any sane way. I have been using more time in doing it than I necessarily think I should. I have been using stronger currents, destroying them rapidly. Some of you who saw me treat a case know that I very seldom use any anesthetic. Probably the people in New Hampshire are not as sensitive as those farther south. My patients in the waiting room waiting for treatment see the patient treated and they are always ready to come in and be treated.

I used to use a five per cent solution of novocain and I do occasionally now when the patient gags a good deal, but nothing else. As you get down to the sensitive tissue after the patient has been through the rest of it they never complain very much about cleaning up the last part of it. I do not think there is any need of using so much anesthesia.

DR. CHARLES R. BROOKE (Newark, N. J.): I listened with a great deal of interest to Dr. Corbett's paper. I would like to speak on the electrothermic treatment. I think I understood the doctor to say he used electrocoagulation and only electrodesiccation when there was some residue left after the treatment. I use entirely electrodesiccation, using the Oudin current from the high frequency machine because you can either do a radical removal of the tonsil or a partial

removal at steps, about every four days. I do not see the necessity of using electrocoagulation unless you want to do a complete removal in a case in which you are pretty sure the reaction will not keep the individual from talking or from his work. With the electrodesiccation method they can continue to work and use their voice after each treatment.

I usually put a little ice in the mouth and then a mouth wash of a two per cent salt solution, which does away with the slight burning effect.

In acute tonsillitis I believe in using ultra violet light preceded by a painting of the throat. We have aborted rather incipient tonsil abscesses with that. If we can get them early it is very good, but after a few days there is not much sense in using it. Otherwise I think ultra violet light is very effective in acute tonsillitis.

I find that a ten per cent solution of cocain anesthesia is very good and that is all the anesthesia I use.

DR. WILLIAM BENHAM SNOW (New York City): I want to speak particularly from the point of saving the tonsil. I was glad to hear Dr. Corbett refer to the fact that all the tonsils were there for some purpose and also that the tonsil should be wisely left. I belong to the conservative side of tonsillectomy very strongly. I believe it is there for a very important purpose. The lymphoid tissue is a disinfectant. The microphages in the mouth are disinfectants. I have seen so many cases of glandular involvement that I feel by removing tonsils you have opened a path that should not be opened. I have an associate in my office now, a young German, who would not think of removing a tonsil from his associates in Europe.

Furthermore, there are ways that have not been mentioned in taking care of the tonsils. The method introduced at the Rockefeller Institute by Witherbee has been very successful. We have treated tonsils before Witherbee made his report and the way we came about it was by treating infections in the neck when the tonsils got better. That led us to begin the use of the x rays in the treatment of tonsils and we continue to use it. I can say that 90 per cent of tonsils can be saved. There are cases that should be operated on. Dr. Greeley's findings would indicate that sometimes we should operate, but I haven't found much indication for it.

We use very much the same technic of Witherbee and our cases that have been treated three, four or five years have the same improvement as from tonsillectomies and have had very good results.

In Denmark today Dr. Hirsh reports that almost all tonsils are slitted, pus removed and the tonsils are left. I think the tendency at this time of indiscriminate removal of the tonsils in children so that they are sent, almost as soon as they start to school, to have their tonsils out, is almost a crime.

Our technic is this: We make the application, not as radium is applied in the tonsil, but we ray through a little orifice of one and three-quarters to two inches in diameter with the head put in a position so that the rays will strike across to the opposite side. We also get rid of the adenoids by this method. Then we ray from the other side at the same sitting. We do this once a week for the first two times, then we give it once in two weeks, and in the average case eight or ten exposures to the tonsils are all that is required. The tonsils are saved for the purpose they were put there.

I am very certain that I am right in my position in this matter and I am very sorry that the tendency is so strong towards the removal of tonsils. I can easily enough see that the laryngologist looks at it from his own point of view, but those of us who look at it from the point of view of saving a part that is put there for a purpose, should preserve the tonsil.

We use a seven-inch backup, four milliamperes for seven minutes. That is the dose we give, through two millimeters of aluminum filter, taking pains that the direction of the rays is crossed from side to side so that it will include each tonsil. The distance is twelve inches. Our cases that we have treated three, four or five years ago are sending in their friends and the results are so satisfactory that I can say safely that 90 per cent of those cases have their tonsils preserved in safety.

Twenty years ago one of my daughters had enlarged tonsils and adenoids. I took her to one of the best surgeons in Boston and had the adenoids removed. He told me the tonsils had to be removed, but I said they were not going to be. She has her tonsils now and no trouble with them.

I have seen hundreds of children with enlarged tonsils. I am very slow in sending a notice to a parent unless it is absolutely necessary in regard to the tonsils. If the child has enlarged tonsils without any symptoms I do not say anything about it. If the child is in poor health I send notice to the parents. I wish I were in a position to say what I think, but I hesitate a long time before I advise the removal of a child's tonsils. They are there for a purpose. They can be saved. I have saved them. X rays, diathermy and the various modalities will surely take care of them.

DR. M. A. COHEN (Boston, Mass.): I wanted to make a remark in front of an audience, but I was afraid to because I didn't have someone with about twenty-five years' experience to back me up. At a

meeting last year I demonstrated some very good results and two days later at the New England Roentgenological Society a doctor got up and said: "In my experience of 2,000 cases I have found that the only treatment is surgery. I have found that the electrodesiccation and electrocoagulation methods are absolutely dangerous and should not be used." I have tried electrodesiccation and I find that electrocoagulation is the best means of taking out the tonsils. I have done about 100 cases and want to cite three.

There are cases that won't have a surgical tonsillectomy even if they were told they would die if they didn't have that done. One woman who had within six months four abscesses of the tonsils was laid up anywhere from two to three weeks or a month. She came in with the idea that she wouldn't have a surgical operation. She came in at lunch time, took a treatment and in five treatments she was perfectly all right.

Another case, an old gentleman, got attacks with tonsillar abscesses with a temperature. We have taken out his tonsils and now, three years since, he has had no recurrence.

The other case was a thyroid case who refused to have the tonsils out by surgical means. While having the tonsil treatment by electrodesiccation you could see the thyroid reduce in size.

DR. J. J. CORBETT (closing): This has been extremely interesting. I think it is worth while to bring out both sides of the question. After listening to Dr. Stewart I see we have some ideas in common.

I think Dr. Stewart did well to emphasize the fact that we should not get fluid in and around our tonsils. It does interfere and destroy the outline of the tonsil and you may put your needle where you don't want it.

Dr. Greeley emphasized the fact that some of these tonsils are a menace to our health.

Dr. Brooke is running on what I consider a middle of the road proposition. A tonsil should either come out or it shouldn't. I believe if a tonsil needs any attention it is going to be radical. It is either good or bad. I do not have any use for an intermediate tonsil.

Dr. Snow very frankly admits he is an ultra contratonsillectomist. At the same time there are many oppositions to that opinion. I think we better accept the spirit of Dr. Otis and co-operate and do what is best for the patient. Retain the tonsil or take it out according to the indication.

PHYSICAL THERAPY ASPECTS OF GALLBLADDER DISORDERS*

CLAUDE L. PAYZANT, M. D.

MEDFORD, MASS.

In taking the part of physical therapy, I cannot but feel the honor that I should be called upon to represent our specialty in what I believe to be the first symposium of its kind. Ten or even five years ago, such recognition of our special field of endeavor was unthought of. Today physical therapeutics represent an acknowledged third part of our therapeutic armamentarium. Surgery and medicine have been the essential factors in the heritage of our profession, and it has been left for our age to see the day of entry, of our particular line of medical effort, into the art of medicine. In a recent conference with one of our leading consultants in cardiology, he made the statement that a physician who does not avail himself of at least some form of physical therapy, was under a great handicap in modern medicine. Physical therapy has won its place, because it has a firm scientific basis and produces definite, uniform clinical results. The profession through its societies should do all in its power to utilize the advantages of physical therapy, develop its scientific possibilities and take it from the hands of irregular practitioners.

In presenting the physical therapeutic aspects of chronic biliary tract disease I am fully aware of the fact that I am presenting for your consideration a fairly new phase in the treatment of this condition. I say new, because of the limited number of physicians who have, or are, employing these methods in their treatment.

The physical methods I have used are as follows: (1) diathermia; (2) vibration; (3) sinuoidal current; (4) static.

Next a classification of cases: (1) simple biliary stasis; (2) definite chronic cholecystitis; (3) cases following cholecystectomy or cholecystotomy; (4) cases of acute and chronic cholangitis.

I believe that physical therapy in these conditions does not trespass on the field of the sur-

geon or internist, but should be an aid to both. No case of acute disease of the gall bladder should be treated by the physical therapist without consultation with a competent surgeon. An impacted stone in the ducts, certain cases of cholelithiasis, or a gangrenous gall bladder belong in the field of the surgeon, and should only be treated by the physical therapist after consultation, or refusal of operation. In view of the recent advance in the field of medicine in the treatment of hepatic insufficiency, many cases should have the advantage of an internist consultation. This I regard as important as the surgeon's place in this field of therapeutic endeavor. We who specialize in physical therapy are the allies of both, and the enemy of neither. I do not agree with the statement made by one of our best surgeons, that any case of cholelithiasis should be operated, in order to safeguard the patient's future life. I feel secure in my position as an advocate of physical therapeutic measures, in the treatment of biliary tract disease, because in my office upward of 4,000 treatments have been given, covering practically all phases of biliary tract pathology, in which physical therapy was indicated.

Touching again on the field of surgery, I know that physical therapy has a great place in the after care of patients who have had an operation on the gall bladder. Many surgeons do not realize that many of these people have symptoms for years following their operations, and some would be glad to have their gall bladders back, with the stones in them, rather than endure the discomforts of a poor postoperative result. The patients go about, seeking aid from one and another, not always reporting to the surgeon, who believes he has restored function, the objective of all therapeutics, and bases his opinion of end results upon incomplete statistics. I have found these to be a most important class of cases for consideration of physical therapy methods, as well as the cases refusing operation. The internist has accomplished much for the chronic hepatic patient by means of non-surgical drain-

*Read before the New England Electrotherapeutic Association. Boston, October 18, 1927.

age of the gall bladder. I know that all of these cases could be additionally benefited by having the advantage of physical therapy. Physical therapy will certainly aid the internist, in so far as his medication is concerned. Let us not as physical therapists, trespass either on the field of the internist or of the surgeon, but recognize that of both and thereby obtain recognition for ourselves. An x ray study of the gall bladder according to present technic, should not be neglected. I have never seen evidence of gall stones disintegrated by any form of therapy.

DIATHERMIA

Diathermia administered in heavy dosage, 1,000 to 1,500 ma., by means of fairly large electrodes, applied anteriorly and posteriorly through the congested or inflamed parts, results in a tremendous increase in blood supply, and in increased secretory activity of the liver, by carrying away the product of inflammatory processes.

We use block tin electrodes, thoroughly lubricated with shaving soap, about 6x8 inches in size, for the back, applied opposite the seventh to the twelfth dorsal vertebrae, close to the spine, on the right side. The skin of the patient over these areas being thoroughly lathered. The anterior electrode, about 5x5 inches, is applied over the right hypochondrium. Contact is made with the reophores by Fahenstop clips or some of the devices on the market. It is unwise and unnecessary to exceed this dosage for this size of electrode.

The patient lies on his back, and the front electrode is held in place with sand bags. In other cases, on whom it is difficult to maintain contact without danger of shorting the current, and thereby producing a burn, we use the mesh covered sponge electrodes, having the patient lie on the left side, the electrode supported by a wooden clamp. This is a more satisfactory arrangement on a thin patient, but the electrodes of this type, as at present manufactured, do not permit dosage as large as the metal electrodes, without discomfort, because the surface area of the largest mesh is smaller and results in too much concentration of heat, with increased risk of burns. The utmost caution should be ob-

served to maintain good contact between the patient and the electrode, and between the electrode and the reophore, because a short circuit taking place between the latter will cause puncture of the block tin, and result in a burn. A burn is absolutely due to carelessness on the part of the technician, and is never justified, for there is no excuse for it, because if the technic is correct, no burn can possibly result. The edges of the metal electrode should be frequently examined, and if found rough, should be smoothed, because shorting will sometimes take place from an imperfectly prepared edge. Touching up the edges with fine sandpaper will correct this. Be sure the metal is rolled smooth before using. We found that the roller with the equipment of a static machine is of more value for this purpose than treating patients with it.

Diathermia will clear up the symptoms resulting from thickened bile in the gall bladder, either in the presence or absence of cholelithiasis. Many gall bladders are the site of chronic, low grade infections, resulting in remote symptoms, such as joint irritation, indigestion, etc. Such patients frequently object to a cholecystectomy or cholecystotomy, and they can just as certainly be relieved of the focal infections in the gall bladder by physical therapy, in which diathermia plays so important a part. Many cases of chronic indigestion, resulting from an inflamed gall bladder are greatly helped by diathermia, repeated two or three times a week, until the symptoms are cleared up. The question of permanency of results arises. If the patient permits himself the same errors of diet and habits that lead up to his pathology, he will certainly have recurrence, but our results compare favorably with those of other methods of treatment. Cures should never be promised a patient having physical therapy any more than cures should be promised from any other form of therapeutic effort. In diathermia the increase in blood supply is immediate and intense, increasing metabolism, overcoming the stasis of an inflammatory process. The flow of bile is increased and local congestion relieved. This does not contraindicate drug therapy, which may be continued according to indication. In fact, much better results will be obtained if physical therapy measures are added. In the chronic

cases requiring stimulation I use either vibration, sine wave current, static, and sometimes combinations of these agents. In the acute cases, sedative diathermia. The stimulative technic consists of rapidly turning on the current to the desired dosage. Continuing seven minutes, then rapidly cutting down the current. For sedative technic, increase the current slowly and decrease the current slowly, the treatment lasting from twenty to forty minutes. A stimulative diathermia in a chronic case alone will produce an active hepatic discharge, even to the production of a diarrhea in a chronically constipated patient. I have demonstrated this many times.

The referred pain from an infected or irritated gall bladder manifesting itself near the eleventh dorsal vertebra will be relieved, because the congestion around the sympathetic ganglia will be reduced.

VIBRATION

Vibration is of great value in the treatment of the chronic hepatic or in simple acute congestion of the liver and gall bladder, due to indiscretions of diet and habits of life. Vibration applied over the cervico-dorsal region, near the seventh cervical vertebra and near the ninth dorsal, then over the liver and gall bladder, will materially reduce the discomfort and hasten the recovery of this class of patients, because stimulation of the sympathetic ganglia at these points causes stimulation of the liver and gall bladder from the first point and dilatation of the ducts through the latter.

SINE WAVE CURRENT

The sine wave current is of great value in the treatment of chronic cases of hepatic and gall bladder insufficiency, because the gall bladder can be emptied of thickened bile by the contraction of the longitudinal and transverse plain muscle fibres, produced by the sine wave current. Emphasis must be placed on its value in the treatment of vicerptosis, as some of the cases of pathologic liver and gall bladders are secondary to intestinal inefficiency, and we often use it as an aid in treatment. The application can be made with two electrodes applied on either side of the spine, near the seventh dorsal,

the current causing contraction of the gall bladder and stimulation of the liver, then by changing the electrodes and applying one to the back in about this region and the other low down over the hypogastrium, a ptotic bowel can be stimulated.

STATIC

I believe that no department of physical therapy has been neglected as much as static in the treatment of these cases. Static may be given in the form of sparks applied over the areas mentioned under diathermia or the static induced current may be used. Static induced current will give excellent results in the treatment of chronic biliary stasis. The hookup for static sparks can be negative to the patient, and the spark ball attached to the ground wire. By use of an overhead ground it is easy to treat a patient this way. In the use of static induced, a bipolar current is used and the current taken from the machine through the Leyden jars (outside coating). Care should be taken to increase the gap between the poles slowly, so as not to exceed the toleration of the patient. This method is of much value in chronic cases. The static spark produces relaxation and relieves pain and lessens congestion. The static induced current increases secretion and by means of its effect upon the muscle fibre, helps to empty the gall bladder.

In this paper the consideration of static has taken third place, not because it should be considered of minor importance, but because in speaking of this agent last I hoped to impress its importance more forcibly.

The effects of the four agents mentioned in this paper are definite. They always work in the same way under the same conditions. No idiosyncrasy of the patient need be considered as in the case of drug therapy. The physician must use the same care in diagnosis and good judgment in the selection of the agent, and the dosage given, as he would in selecting the drug or combinations of drugs. I know these agents will do these things, because I have observed their effects by x raying gall bladders prepared by the Graham-Cole method of cholecystography, giving the treatment, and then

preparing another radiograph immediately. A ten-minute treatment with a sine wave current, properly given, will result in the complete disappearance of the dye shadow in most cases, due to its production of contractions of the gall bladder muscle fibres. A similar effect was observed in the use of the other agents mentioned, but they were not as efficient in causing the gall bladder to empty as the sine wave.

DISCUSSION

DR. WILLIAM BENHAM SNOW (New York City): Dr. Bassler's pros and cons have been so elaborately covered that we can only agree with him. I am sorry he did not say more about diathermy. I think he admits it is one of the greatest methods of defense and I would like him to say more about it when he closes his discussion.

The study of the pathology of gall bladder troubles has been very much cleared up in recent years. The method of diagnosis cannot be entirely relied upon, but it approaches it more nearly than ever before. The method of the findings by x rays has been very much improved.

I was glad he did not elaborate too much on the drainage of the gall bladder. I think it is far better to let the bile go along its way. We used to wonder why the administrations of cod liver oil were beneficial. It was because the response of flow of bile was due to the presence of fats. The use of diathermy has really opened up for us one of the most promising fields of health because it not only relaxes the common duct with the heat, so facilitating drainage, but it also effects the process there with the hyperemia induced.

I am glad Dr. Bassler spoke of the matter of the teeth and swallowing of the pus bacteria accumulated in the mouth and from the tonsils as being an element of cause. I have never heard that presented as well as he has. That is a new idea today, but it is a very important point that he brought out. I think he has covered the ground as I have never heard it covered before.

DR. ARTHUR L. BROWN (Winchester, Mass.): I was particularly interested in the phases presented by Dr. Bassler when he said that in closing a preference was towards the medical aspect in treating gall bladder disease rather than surgery. That was brought out very well in an early experience I had in the treatment of gastric diseases, purely from the standpoint of medicine.

Dr. Payzant brought out some interesting features in the distinctive combinations he uses. I would like to emphasize the value of the static induced current that he has referred to and ask you to try the effect of that as regards opening your terminal. I have had the experiment tried on myself. It is a wonderful relief and it is singular how many people who have hepatic

stasis that will actually take their position on the table with a definite phobia and they will almost die from heart failure, but they experience great relief immediately.

Dr. Clute has referred to a certain type of case where he would like to perform surgery of gall bladder disease, but owing to the patient's condition it is not considered advisable. There are certain surgical aspects there that every surgeon would like to perform, but there are a great many cases where the risk is purely a speculative risk. During the last three years I have collected ten cases of gall bladder disease where we have proven that the gall bladder was absolutely filled with stones. All these cases presented acute colic where they had had to have at least a half or three-quarters of a grain of morphine to relieve the colic. We have treated those cases because they were not a good surgical risk, most of them being in the sixth or seventh decade of life. We have treated those cases by using diathermy, the static induced and the x ray. The oldest case we have has been relieved for three years and the last one has gone a year and a half without a recurrence of any of the symptoms. That has been more of an attempt in my experience to relieve that class of cases where it was purely a speculative risk for surgery. I am watching those cases to see what percentage of relief in the cases that cannot be classed as good surgical risks we can obtain.

DR. GEORGE J. OTT (Boston, Mass.): Dr. Payzant's description of gall bladder disease treated by means of physical therapy was masterful and I do not know that I could add anything to it. He has practically quoted my ideas and my feelings in regard to the matter very well.

As far as Dr. Clute's description of the surgical aspect is concerned I have had so little experience with the surgical aspect of it that I cannot add anything that would be of interest or value, only the one thought, so far as the two papers are concerned, that we should not be so easily disposed to overlook the seriousness of gall bladder disease and that includes a number of conditions as we oftentimes are ascribing it to indigestion, to pleurisy, to raised or elevated diaphragm or perhaps to gastropnoia, dyspepsia or what not. If we were a little more accurate in our diagnosis, examined our patients more carefully by means of the x ray as well as by all other means, I feel we would avoid many of the mistakes members of the medical profession make and many of the patients go the rounds of people not medically trained and give the medical profession a name that it does not deserve.

DR. MARY L. H. ARNOLD SNOW (New York City): It would be difficult to add to those most interesting papers, but I would like to make a plea for the use of radiant light and heat in the treatment of these conditions. Radiant light and heat must be applied for at least one-half hour, if not longer, and it may be used not only alone, but in conjunction with diathermy or

static. It may be used not only in the treatment of biliary congestion or stasis, but also for the attacks of biliary colic it is most helpful and comforting and I speak from personal experience. The itching is sometimes relieved or benefited by the use of ultra violet or the carbon arc lamp.

DR. DE WITT G. WILCOX (Boston, Mass.): I would like to call attention to the very great advantage of employing the transverse incision as compared with the old up and down incision. This was demonstrated four or five years ago at the College of Physicians and Surgeons. The transverse incision, according to my experience and observations, has a number of advantages over the up and down. First, it allows a greater freedom in the general manipulation and examination of the upper abdomen in the vicinity of the liver. It is better to cut a muscle transversely, but we can cut both muscles transversely. Usually with the transverse incision it is necessary only to sever the right rectus, going directly transversely across the region of the lower ribs, then severing the ribs. When the sewing up begins it is so much easier to repair a transverse incision as the peritoneum above comes together much better than with the up and down incision. The objection has been that we are more likely to get a hernia, but I have not observed it in the cases I have treated.

As illustrating an interesting point physiologically I want to cite a case that I had in hand a number of years ago. A woman about 60 years of age had a painless jaundice. We diagnosed a cancer of the gall bladder and upon her urgent request we made an operation in which I removed the cancerous gall bladder entirely, made an effort to remove a portion of the common duct, but it was so infiltrated that we were only able to free a portion. When we had finished the operation, the gall bladder had been removed and the tube had been attached to the cystic duct. As a result, of course, it was impossible for any of the bile to pass from the liver down into the intestine, but the patient was relieved of her jaundice. We did not expect to give her any more relief than to simply relieve her from the increasing jaundice. At the end of three or four weeks her jaundice disappeared entirely and her strength increased. I made a second operation about three weeks later and during that three weeks nature had built up a fistulous tube around the impaired tube that had been inserted so that there was still an artificial duct. Making the secondary operation we brought the stomach in close contact with the stump of the hepatic and inserted that stump directly into the stomach. The bile then went through this short stump and into the stomach. Her appetite and strength improved and she lived for some three months thereafter, dying of a metastasis of the liver. This demonstrated the possibility of carrying bile into the stomach without any amount of gastric disturbance and keeping the patient comfortable for that period of time.

DR. GEORGE E. PERCY (Salem, Mass.): The different phases of this very common trouble have been pre-

sented in such a way that I do not think there is much to add. The one thing that impresses us is the necessity of realizing that you must individualize. Many cases are essentially surgical and they must be recognized. My experience in these cases has been very limited, but I have found very marked results in these common cases where the symptoms are not very active from the diathermy treatment, a mild current, perhaps continued for fifteen or twenty minutes. Many of the symptoms will be cleared up by this treatment.

Diet, which has already been emphasized, is essential. It is one of the most important factors. It often contributes to the trouble. If we lived and exercised properly we would not have these troubles.

Another thing Dr. Bassler spoke of was the greater frequency of these troubles in these days of automobiles and inactivity. I think it is a factor that more thought must be given to.

DR. ANTHONY BASSLER (Closing): I think the best part of a meeting is the discussions. I think it is impossible to really discuss a paper because the reader has generally certain points of view and you have not had experience with them and it is very difficult, especially where there is an interpretation on case reports.

Radiant light and heat is undoubtedly a great relaxer of the abdomen and from a surgical experience with peritoneal tuberculosis and the use of radiant light I do not know but that we are not as well off with the light and that it has some value in all infected conditions in the abdomen there is no doubt.

It is true, as Dr. Clute has said, that the majority of cases of these troubles have not clinical types of jaundice. I think the statistics are about 30 per cent, but our experience has been that in working, as he suggested, on the blood serum and the urine, we certainly do find a low grade type of jaundice. They may be toxic types, obstructive types, in which that figure of 30 per cent could be raised as high as 60 or 70 per cent. Of course, in a symposium like this—gastric ulcers and others—the surgeon presents his side. When you read the surgery of the subject it is all surgery and then you read the medical man's side and he wobbles around both ways, and so on.

With apologies to Dr. Clute and the Mayo Clinic, I want to say that I am not altogether in agreement with accepting the strawberry gall bladder or the simpler types of chronic cholecystitis as definite indications for surgery. I am not going to say that I believe any of them are, but I will say that there is in that type of case an indication for the medical and perhaps the physical treatments which have been found most worth while. While I may take a few of those cases away from Dr. Clute and Dr. Leahy, I want to present them with a type of case the medical man is not familiar with. As case after case comes along and is diagnosed, it is interesting that where you can prove that that individual has a deficient pancreas, understand now

that it is a gall bladder case and in addition to that there is a deficient pancreas, I want to say whatever its pathology is, however simple it may be, that case should be operated on. We have followed enough of them now to be satisfied that although you may render them symptom free and improve them very much in the course of time, the general health runs down; they get diabetes and other things and the trouble is a real organic disease in the pancreas which has been brought about by the infection in the gall bladder and ducts.

That brings up the question of the sugar intolerance test, which we do not use any more, as it is stated in the books. We find that the best sugar intolerance test or carbohydrate intolerance test you can employ is to tell an individual to go out and eat a large carbohydrate meal, oatmeal, rice, etc., and then have him come back one or two or three hours after that and examine the urine. While it seems more accurate to do the thing scientifically, giving a certain quantity of sugar and then testing the urine, we find that unnecessary and have seen some errors in that also. Sometimes these laboratory procedures in their findings lead to errors and that simple test of eating a large carbohydrate meal and then examining the urine afterwards is all that is necessary.

The best way to empty a gall bladder is to give a fat meal. By the Lyon-Meltzer procedure you may empty one-third or one-half or you may not touch it at all. Give that individual a meal of crackers and cream and I have yet to see an individual who has not emptied one-half, and some of them completely. So why bother with the duodenal tubes and all that thing when ice cream parlors are on every corner?

When you come down to that type of a diagnosis I would leave with you these words: You deal here not only with the question of the symptoms that this individual has, for which they come in to you for relief, but you deal commonly with a status of affairs that, like many conditions in the abdomen, has an accumulating pathology. An accumulation of the pathology is not only upwards, as in the liver, as Dr. Clute has suggested, and which is true, but it is included likewise in the pancreas. While there has been very little attention showed to the pancreas in medicine because of its inaccessibility, it is true that in so far as chronic gall bladder conditions are concerned there is one thing you must do at the start. Find out if possible if the pancreas is showing a deficiency of action and if so to consider the case surgical at the start.

DR. CLAUDE L. PAYZANT (Closing): In closing my part of the discussion on this interesting subject I would like to say that I am grateful to Dr. Snow for her remarks on the use of radiant light in the treatment of these conditions. I suppose Dr. Arnold Snow wondered why I didn't include radiant light in my paper. It was not that I didn't recognize the value of radiant light in the treatment of gall bladder conditions, but nevertheless I was taking up the subject more from the

standpoint of the efficiency of physical therapy measures in treating these conditions and I have nothing to offer by way of experimental work to support my contention, that physical therapy methods are efficient in the treatment of biliary stasis in so far as radiant light is concerned.

There is no question but that the fat meal will empty a gall bladder very rapidly. Anyone who has done much work with cholecystography knows this to be so. On the other hand, there are a great many patients suffering from hepatic insufficiency and chronic cholecystitis who do not tolerate fat in excess in their diet. You can even make them quite ill by the administration of a fat meal and I do not think diet, including a heavy percentage of fat, helps these patients. A fat-free diet is of more value in the treatment of chronic hepatic insufficiency with chronic cholecystitis than any other thing in diet.

Dr. Clute went into the technic of cholecystectomy in a way I was very much interested in. I have seen many cholecystectomies. I have seen very few cholecystectomies in which care was taken to thoroughly expose the ducts and arteries. I think that explains why we have so many of these cases in our offices suffering from a poor postoperative result. It is not the fact that surgery was used, but that the technic was incomplete. These patients suffer from partial obstruction of the ducts and inhibited blood supply to the parts. That is why I brought up the point that they were such an important class of cases for us to consider as physical therapists because in treating these cases I have gotten some of my best end results.

DR. HOWARD M. CLUTE (Closing): I want to thank the society for the opportunity of coming down here and talking to you. I have appreciated the honor and I have enjoyed listening to the papers of Dr. Bassler and Dr. Payzant. As I came down I wondered what could be said about the physical therapy treatment of chronic biliary tract disease or what could be done in the medical way because I have a surgical turn of mind and I see everything from that angle. Probably in some instances we have been too enthusiastic for our own specialty and I am glad to know that there are other things besides surgery. I knew it, of course, but did not appreciate it. I do not think surgery cures every case. I do not believe every case we think is cholecystitis should be operated on at once. They should be given the opportunity of improving, of recovering from their trouble by medical management, medical treatment, or by other methods such as those Dr. Payzant recommended. I have no personal knowledge of the measures of physical therapy which have been recommended, but I am certainly very much interested. I didn't realize or know that one could cause the gall bladder to contract by certain types of electrical currents. That being the case it seems to me that there is certainly some logic in the treatment of these cases.

I was particularly interested and appreciative of what I would call the conservative attitude which was

adopted by both the exponent of the medical measures and of the physical therapy measures. That is, they were conservative from the point of view in that they didn't think that surgery was never of any use, as some people do in gall bladder disease, or was rarely of any use. I think we should all realize that no matter what our specialty may be, no matter what our particular line of interest may be, there are cases that demand surgery in biliary tract disease without any question.

We frequently see patients who have had repeated attacks of distress in the upper abdomen followed by tenderness over the gall bladder who show nothing save a cholesterol gall bladder, the so-called strawberry gall bladder, who after operation recover and have no fur-

ther attacks of this type of pain or of any type of upper abdominal pain. In my opinion surgery is indicated here. Any time that I felt certain that a patient had it I would have to advise honestly that the gall bladder should be removed. I cannot conceive that the cholesterol gall bladder is anything but the immediate predecessor of gall stones.

I think we should all, however, try to be conservative, each in our own field. I should be conservative as a surgeon, and also the medical man and the physical therapist should be conservative in their failure to prolong too long medical or physical therapy methods in the treatment of biliary tract disease.

OSLER'S "TEN BEST SELLERS"

1. Old and New Testaments.
2. Shakespeare.
3. Montaigne.
4. Plutarch's Lives.
5. Marcus Aurelius.
6. Epictetus.
7. Religio Medici.
8. Don Quixote.
9. Emerson.
10. Holmes' Breakfast Table Series.

EDITORIAL

ARCHIVES OF PHYSICAL THERAPY, X-RAY, RADIUM

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INFRA RED RAYS AND PHOTOCHEMICAL PHARMACOLOGY

Recent advances must attract the attention of the profession to the profound changes in substances brought about by photochemistry, changes of such magnitude that the dreams of ancient alchemists fade into insignificance.

One need only consider Vitamin D. to realize the import of what has already been accomplished and what, doubtless, the near future holds in store for us. Fosbinder, Daniels and Steenbock¹ have prepared antirachitic material from cholesterol. The surgeon knows cholesterol as the wax-like component of gall stones, and yet a tiny flake of the physiologically inert substance required, according to the foregoing investigators, but a fraction of the energy given off by a smouldering match, in all less than 300 ergs, to produce complete transmutation from inertness to activation and which possessed curative properties for rickets.

Were it not for actual demonstration by animal experiment, it would sound incredible, but it is a fact nevertheless, that a twenty billionth of a gram of transmuted cholesterol suffices to produce calcium deposition in a rachitic rat.

Photochemical pharmacology has existed in nature's laboratory from the beginning of time, since sun-light with its infra red, ultra violet and visible light has been effecting vitally important transmutations. The entire flora down to the minutest cells accomplishes, under the

influence of the sunlight, what casual observers must consider well-nigh miraculous. There is not a single vegetable drug known to pharmacy, whose very existence does not depend upon photochemistry. And if we accept what seems to be rational, namely, that every ray of sunshine is constantly at work effecting prodigiously volumes of transmutation, we have a simple, natural explanation of the source of our supply of food and drugs of a vegetable character.

The questions that now propound themselves concern the narrowing of the synthetic power of sunlight to a limited region showing scant presence of ultra violet rays. The scientific mind grapples with the question whether the near ultra violet and visible light rays are ineffective in the labor of transmutation. Equally important is the enigma of the infra red rays, which, while making up the greatest part of the solar spectrum (80%), were supposed to remain useless in what is best described as photochemical pharmacology.

Evidence is accumulating that some of our older conceptions have been erroneous. Perrin² and other investigators make no distinction between infra red and ultra violet rays, accepting both as a form of light, which carry energy into substances in which they are absorbed.

We know now that while glass placed in the path of sunlight cuts off a vital portion of the ultra violet spectrum it also cuts off a far greater amount of photo active infra red radiation. It is palpable that it is neither scientific to ascribe the effects of unfiltered sunlight to a really small fraction of ultra violet rays—which we know do not penetrate glass—nor correct to ignore the greatly larger quantity of infra red rays, which, too, cannot penetrate glass.

Nor can we ignore certain experiments which point in the direction of infra red rays and to their possible participation in the phenomena of photochemical pharmacology. Pacini and Cros-

ley³ reported one of a series of experiments which they are pursuing. They found that a certain edible oil suffered a curious change when it was exposed to ultra violet radiation. But the same change was noted when the same oil was exposed to infra red radiation. Visible light appeared to be without effect; but the oil absorbed readily in the infra red and in the ultra violet, and inappreciably in the visible region of the spectrum.

Henri⁴ has published extensive experiments in which he constantly observed that substances which absorb in the ultraviolet show absorption also in the infra red and, what is more, he showed that usually the frequency of the region of infra red absorption was nearly always a whole number multiple of the frequency of ultra violet absorption. Substances seem to show a tendency to behave in somewhat the same manner when they are exposed to proper "octaves" of radiation.

The clinical evidence seems to support these similarities. Leonard Hill⁵ found that ultra violet radiation produces an erythema on an arm in much longer time in the absence of heat than is produced when the same arm is warmed; or, what amounts to the same thing, when the arm is flooded with infra red radiation. The two energies appear to be synergistic in this effect.

The practical horticulturist finds that sunlight's heat, or its infra red behaves like ultra violet. Many young and growing plants cannot withstand the excessive stimulation produced by too much ultra violet radiation; but neither can these same plants withstand too much infra red exposure. We have all seen the greenhouses covered with glass, which screens off a certain fraction of sunlight's ultra violet, and the glass coated with a whitewash to lessen further the passage of light and heat, for too much infra red is as deleterious to plant growth as too much ultra violet radiation.

Photochemical pharmacology needs to be more clearly recognized and investigated in the laboratory, with living things and in a vital way. If, as Huntington⁶ has shown, climate and civilization are so obviously related, it is not too

much to infer that climate and health are related. As sunlight is a factor in climate, the analogy can be pushed further to say that sunlight, all of sunlight, is concerned in some fashion with the well-being of living things. And of sunlight, its greatest portion, the infra red, must of necessity be in some measure responsible for the thriving world of plants on which we animals live.

—Disraeli Kobak.

1. Fosbinder, Daniels and Steenbock; Jour. Amer. Chem. Soc., 1928.
2. Perrin; Les Atomes.
3. Pacini and Crosley; Clinical Medicine and Surgery, 1928.
4. Henri, V.; Photochemie, 1915.
5. Hill, Leonard; Sunshine and Open Air, 1924.
6. Huntington, E.; Climate and Civilization, 1922.

LIGHT AND LIFE.

It is not difficult to understand why so many of the ancient and primitive peoples had a common object of worship in the fire, the sun, the rainbow and the lightning. Apollo, the "Sun God," and another, Helios, whose name literally meant the Sun, were among the Greek divinities; they were worshipped in elaborate temples. The Phoenicians were also notable worshippers of the sun. The Peruvian Incas claimed to be "Children of the Sun." Perhaps from the beginning of time mankind has always regarded the sun as the giver of life. Aristotle concluded that there were four elements in the physical world, and these elements were Fire, Earth, Water and Air. Fire he placed first, because there were associated with it light and heat. But Aristotle was a philosopher, and in a way, a scientist; he therefore concluded that there might be another element not yet discovered, a fifth element, or "essence," over and above the rest; and hence he called this unknown element the "quintessence," or fifth element. Thus the word has passed into our common speech.

History is filled with descriptions of ceremonies in which light has played an important role. Birthday candles denote the measure of life, and form part of the ancient custom of acknowledging the origin of life. In many religious ceremonies, both ancient and modern, the

symbolism of light is prominent. Earlier civilizations associated these symbols with life, health, friendliness, warmth, bountiful harvests, happiness, divine love and power, and the salvation of body and soul. Civilization really began with man's discovery of fire-making. Thus he learned to utilize a tremendous and beneficent power. Not only could he warm himself in comfort, and cook his food, but he learned to shape his pottery and his metals by means of fire. Around the fireside, and in its pleasant light, his work could be continued beyond the daylight hours. The camp-fire was his place of tribal conference, of safety, of comfortable sociability. Throughout the thousands of ages these sensations have implanted themselves into our brains, and today are our common heritage. Every man loves the open fire, with its light, cheer and comfort. The campfire of the Boy Scout is the harkening back of millions of years into the dim recesses of the past, when every man felt the safety of the light and fire. These tribal memories have come down to us all; the campfire is an instinctive expression of physical comfort. Man soon found, too, that his wounds healed more readily in the sunlight. Many animals thus instinctively expose themselves and their injuries to the healing warmth of the sun. This elementary light therapy has been practiced since time immemorial.

It has remained for the present age to ascertain scientifically the values of light upon life and growth of animal and vegetable tissues. It was about the year 1800 when the French began to make accurate and scientific study of the effects of sunlight in diseased conditions, especially tuberculosis, and discovered that heliotherapy was a potent curative agent in tubercular conditions; but a general appreciation of the values of light advanced rather slowly in the minds of medical men. Nearly a hundred years later, in 1899, Finsen first demonstrated the values of ultra violet rays in certain skin conditions, notably lupus, and received the Nobel prize in Medicine in 1903. In 1902, Bernhardt, of St. Moritz, Switzerland, treated suppurating wounds by sunlight, with marked benefit. A year later, Rollier, of Leysin, opened his now famous sanitarium for the treatment of extra-pulmonary tuberculosis.

The sunlight treatment of joint and glandular tuberculosis, especially in children, and in rickets, has been widely practiced in the past twenty years, but still does not receive attention and application by the medical profession, which would seem desirable. This country has been particularly slow in this regard. Germany, France and England have done much more with heliotherapy than we on this side of the water. It is true that there are some tuberculosis sanatoria which make use of this form of treatment as a major means of cure; perhaps all of them use it somewhat generally. Location and weather conditions, however, are not always favorable for daily applications of the sun's rays. We have all heard the saying that "the sun is the best doctor in the world, but you can't always make an appointment with him."

The importance of radiation is becoming increasingly great in realms of biology, botany, physiology, and even psychology, for light and its by-product heat, brightness and color, have much influence upon mental life, as well as upon the actual structure of living things. All of us are effected by gloomy weather, and know its depressing effects, when long continued. Arctic explorers have said that the cold is not so hard to bear as the absence of light, in the long winter night. The cheerful effects of a bright sunshiny day are well known; even the interior decorators of houses are studying the psychic effects of certain colors and combinations, and certain proportions of light and shade, which unconsciously affect us all who must dwell in houses. The tremendous change in illumination which has taken place within the past half century has been remarkable; electric arcs and filament lamps supply great quantities of radiation; the discovery of the x ray and of radium have placed in our hands potent agencies for diagnosis and treatment. All of these radiations are of the same physical character, differing only as to frequency or wave-lengths, but all of them influencing all animal and vegetable life. Many of the effects of light on vegetation are common observations with us all. The photo-tropic properties of plants is interesting and constant. Coniferous trees are shaped so as to offer the greatest surface to the influence of the light. Photographs of maple trees, taken from platforms erected

above the trees show that the leaves are extended during the hours of sunshine almost horizontally, in order that the tree may absorb a maximum of the light.

All of our study brings us to the conclusion that light is essential to human beings as well as to vegetation, but it must be remembered that excessive light is injurious. Any agency potent for good is also potent for evil. Thus the good effects of light may be reversed. Investigators have shown that the irradiation of oils and food-stuffs by the ultra violet arc actually introduces into them much of the anti-richitic vitamin, but that too prolonged irradiation (several hours) destroys the very vitamins that had previously been introduced. Our problem is to discover the limits and boundary lines between proper dosage and over dosage. This is not settled at present.

While most living things, animal and vegetable, thrive in light, many species prefer darkness rather than light. Many land species live in soil, in wood, in burrows, caves, or the shade of dense woods in the daytime. This applies to many rather large animals which prowl at night. But the man is an out-door animal, and prospers in the sunlight. Those forms of vegetable life which live in darkness are of low order, and are not dependent upon chlorophyll for their growth and development. Mushrooms and certain parasitic plants are examples; also most forms of bacteria and low organisms.¹ White ants are readily killed by strong sunlight; they build tunnels to reach food. But most of the animals and organisms that live in darkness depend upon sunlight for the production of most of their food.

Certain radiations of sunlight are responsible for sunburn, or tanning of the skin. This is an example of the tendency of living things to adapt themselves to an environment. The actinic rays of the spectrum, (the ultra violet) are chiefly responsible for tanning. Hence in the tropics and adjacent latitudes the skin becomes dark by pigmentation. In more northern latitudes, with less intensive sunlight, protective pigmentation is not so necessary, hence the development of the blond type in the more northern countries. The inhabitants of northern Europe are good examples, of superior intellect and physique. These people have often been con-

querors of the less vigorous southern types. It is said that the Greek nation is a fusion between the tall, fair-haired races of the north and the short, dark, artistic races of the south of Europe and the southern coasts of the Mediterranean. Hence in the early history of the Greeks, we find the artistic temperament strongly developed, as well as athletic physiques. The dark races of the Arctic, the Esquimo, seem to be an exception to the rule under discussion; but it has been explained that the Esquimo are really recent arrivals in the northern environment; at least recent as far as evolution is concerned, and that they migrated to the northern latitudes from a more southern climate. Blond Esquimo have been discovered, tribes of which are no doubt older inhabitants in the northern environment. It may be that the sunlight reflected from the ice and snow makes the dark skin desirable.

Sunburn is caused by the exposure of the skin to the bright sunlight; a greater quantity of blood in the areas exposed results, and some of this blood pigment (hematin) enters the skin and is deposited in the cells; hence the skin is left tanned and pigmented. It is not quite apparent why there is so great a difference in individuals in their ability to tan. Some investigators have concluded that tanning represents a defensive reaction of the body to furnish protection against the shorter and more irritating wave-lengths. Rollier says that tanning is an adaptive response on the part of the body, the pigment acting as a transformer of energy, which is capable of absorbing radiation best suited to the health of the organism. This seems very reasonable.

Lukiesh makes the interesting comparison of the human body to a radio receiving set, and states that the human body is a receiving station, "tuned in" to certain wave lengths that are constantly being broadcast by the sun. The cells receive messages as warnings of danger; but the greater number of messages are conveyed for the promotion of cellular activity, and for the health and function of every organ and tissue. Each cell is an energy transformer. Ultra violet and other wave-lengths of light seem to be transformed from light energy to other forms of energy necessary in the functioning of the human body.

In contradistinction to the beneficial effects of light, we must not forget the actual traumatism which may be caused by overdose. Sunstroke is the best example. No doubt the longer wave lengths of the infra red are very active here to produce the damage and the sudden high temperature which we find in sunstroke. A fact to be borne in mind is the susceptibility to second attacks; ultra violet irradiation in patients who have previously suffered from sunstroke should be very cautiously administered. Thus we see two extremes—sun traumatism and sunlight starvation. Each is disastrous. Rickets, anemia, spasmophilia, tetany, and other diseases may be ascribed to sun starvation.

Hess says that the rays of the sun need not strike the surface of the skin directly, but that clothing may be a filter material, depending upon tissue and thickness. Black clothing is generally conceded to absorb more of the ultra violet than white clothing which may contain the same number of threads to the square inch and manufactured in the same loom.

The influence of light on many parts of the body metabolism is profound. The growth of bones and teeth is largely dependent on proper exposure of the body to sufficient light. The haemopoetic functions all seem to be likewise influenced, as well as the glands, ductless and otherwise. Rollier makes the interesting observation that the effect of sunlight on the muscles is constant and considerable, and speaks of the growth and firmness of muscular tissue which seems to result from heliotherapy, even when the affected muscles are exercised but slightly. He contends that light powerfully maintains muscle tone, perhaps due to adrenal stimulation in a way which is not well understood.

Like plants, men are helio-tropic. We are slaves to the light, and turn to it as involuntarily as the moth flies to the flame. The whole nervous mechanism of the moth is tuned to the stimulus of the light which eventually destroys him; man is learning to utilize the values of heliotherapy, and to avoid the injuries. The study must still be pursued with vigor, before we may say definitely what should be the wave lengths of greatest value, what the proper dosage, and

what the diseases which yield most readily to solar irradiation, or substitutes therefor. Although we are limited in knowledge, we still may believe that the "light is good."

J. C. Elsom, M. D.

University of Wisconsin, Madison.

¹ *Light and Health: Lukiesh and Pacini.*

CLINICAL CONGRESS OF PHYSICAL
THERAPY
AND
SEVENTH ANNUAL MEETING
AMERICAN COLLEGE OF PHYSICAL
THERAPY

Stevens Hotel, Chicago

OCTOBER 8th TO 13th, 1928

Some interesting developments pertaining to the annual fall session of the College may be imparted at this time. First and foremost is the fact—and a great surprise to the medical profession of this country—that Dr. Carl Sonne of the Finsen Medical Light Institute, Copenhagen, will be our guest of honor. Dr. Sonne will give several important lectures, the titles of which will be announced in the preliminary program to be off the press about July 15. The second important development is that in addition to Dr. Sonne, several other foreign leaders in physical therapy will be with us and will offer valuable contributions in the experimental and clinical application of physical agents.

The program this year is unique in character. Never before at a meeting of this kind has such an array of talent been gathered together. Every possible source of information for teaching purposes and for instruction facilities has been exhausted. The result will undoubtedly be the greatest physical therapy meeting in history and one that will set a mark difficult to surpass in the future.

The additional feature of scientific exhibits should prove of unusual and extraordinary interest. No truly scientific medical meeting is complete without a display of scientific exhibits. And while an effort was made in the past to effect such a display, this year will see it in actual existence. This attraction in itself should

provoke an overwhelming desire on the part of physicians, teachers and scientists to acquaint themselves with the numerous new phases of physical therapy presented in a strictly ethical and scientific manner.

As has been the custom heretofore, instruction classes will be offered, but instead of conducting these classes during the first three days, they will be given mornings during the first five days of the session. The afternoons will be devoted to sectional meetings, group clinics, demonstrations, clinical lectures, and the reading of scientific papers. The last day of the session, as has been the custom heretofore, will be given over to hospital clinics. These will be augmented in number, so that it will be possible to accommodate more visitors than during the past few years.

A partial list of lecturers who have accepted invitations to address the Congress follows:

Dr. Carl Sonne, Finsen Medical Light Institute, Copenhagen, Denmark.

Dr. C. S. Alloway, Champaign, Ill.

Dr. W. L. Cahall, Astoria, Long Island, N. Y.

Dr. F. W. Carruthers, Little Rock, Ark.

Dr. Gregg A. Dillinger, Pittsburgh, Pa.

Dr. D. Kobak, Chicago, Ill.

Dr. F. H. Ewerhardt, St. Louis, Mo.

Dr. Louis Feldman, Boston, Mass.

Dr. M. H. Cottle, Chicago, Ill.

Dr. H. M. Johnson, Buffalo, N. Y.

Dr. H. D. Holman, Mason City, Ia.

Dr. J. A. Key, St. Louis, Mo.

Dr. Laura A. Lane, Baltimore, Md.

Dr. Frank M. Mikels, Long Beach, Cal.

Dr. R. W. Fouts, Omaha, Neb.

Dr. A. R. Hollender, Chicago.

Dr. V. C. Pederson, New York City.

Dr. Norman E. Titus, New York City.

Dr. Frank H. Walke, Shreveport, La.

Dr. J. Thompson Stevens, Montclair, N. J.

Prof. V. E. Levine, Omaha, Neb.

Dr. G. Kolischer, Chicago.

Dr. S. T. Snedecor, Hackensack, N. J.

Dr. L. J. Levinson, Bronx, N. Y.

Prof. Carl R. Moore, Chicago.

Dr. L. K. McCafferty, New York City.

Dr. Garrett Nelson, Richmond, Va.

Dr. Ralph Pemberton, Philadelphia, Pa.

Dr. J. W. Torbett, Marlin, Tex.

Dr. S. H. Watson, Tucson, Ariz.

Dr. J. S. Coulter, Chicago.

Dr. F. T. Woodbury, New York City.

Dr. Louis Gries, Chicago.

Dr. Maurice Weisblum, Philadelphia, Pa.

Dr. E. N. Kime, Indianapolis, Ind.

Dr. H. A. Barrett, Chicago.

Dr. E. W. Hirsch, Chicago.

Drs. Withers and Ranson, Denver, Colo.

Dr. J. H. Hester, Louisville, Ky.

Dr. Curran Pope, Louisville, Ky.

Dr. J. Peter Herman, West Palm Beach, Florida.

Dr. Ralph B. Bettman, Chicago.

Dr. A. F. Tyler, Omaha, Nebr.

Dr. A. D. Willmoth, Louisville, Ky.

In view of these intensive preparations and a determined effort to afford each Fellow or guest an extraordinary means of acquiring current information in scientific physical therapy, it behooves every physician to make the necessary arrangements to be present at this Congress. The hotel accommodations are excellent and rooms may be reserved at popular prices from \$3.50 upward by writing directly to the Hotel Stevens, Chicago. In addition to the many attractive features of the meeting itself, Chicago offers every possible attraction for out-of-town visitors. Be sure to tab the date correctly—October 8 to 13, 1928.

AMERICAN ELECTROTHERAPEUTIC ASSOCIATION

The thirty-eighth annual meeting of the American Electrotherapeutic Association is to be held September 10-14, at the Hotel Statler, Boston, Mass. The program of the meeting includes papers and committee reports regarding all phases of physical therapy, both from the standpoint of research as well as of clinical application. Two days will be devoted to visiting physical therapy clinics in Boston institutions and also to a visit to the plant of the General Electric Company in West Lynn. There will be also a large technical exhibit demonstrating new apparatus and accessories. All legally licensed physicians are welcome, and programs can be obtained by addressing the

Secretary, Dr. Richard Kovacs, 223 East Sixty-eighth street, New York.

NEWS ITEMS

Dr. A. B. Hirsh, first vice president of the American Electrotherapeutic Association, is sojourning in Europe, visiting England and France, and will represent the association as a delegate at the first International Conference on Light, to be held in Lausanne, Switzerland, September 10-13. Dr. Hirsh is due to return about September 22.

Dr. Richard Kovacs, who has been serving as secretary of the association for the past seven years and who, upon his own request, is now retiring from this office, has sailed for Europe for a period of rest and study. He will visit the physical therapy clinics in Germany, Austria, Hungary, and Spain, with the Travel Study Club of American Physicians, of which

he is secretary, and will attend the fourth International Medical Congress of Industrial Accidents and Occupational Diseases, in Budapest, September 2-7, of which he is American secretary, and will present a paper on "Physical Therapy in Traumatic Conditions" before the congress. He will also attend, as an alternate delegate of the association, the first International Conference on Light, in Lausanne. Other fellows of the association in the study party include Drs. Madge C. L. McGuinness, Anna Kubista, L. L. Cox. The party is due back in New York on October 5.

ERROR

In the June issue of the *Archives of Physical Therapy, X Ray, Radium* a review of the book, "Urography," by Braasch and Hager, was published. Inadvertently the publishers' name was omitted. The book is published by W. B. Saunders Co., Philadelphia.

The late Chauncey M. Depew maintained that a man can do a year's work in ten months, but not in twelve.

THE STUDENT'S LIBRARY

BOOKS RECEIVED

This column is devoted to acknowledgment of the books received. Such acknowledgment must be regarded by the sender as sufficient recognition of the courtesy until time and space permit selections to be made for review.

A MANUAL OF OTOTOLOGY. By *Gorham Bacon*, A.B., M.D., F.A.C.S. Consulting Surg. N. Y. Eye and Ear Infirmary; Fellow Amer. Coll. of Surg., and Fellow N. Y. Academy of Med.; formerly Prof. of Otology, College of Physicians and Surgeons, Columbia University, etc., and *Truman Laurance Saunders*, A.B., M.D., F.A.C.S., Assistant Prof. of Laryngology and Otology, Coll. of Physicians and Surgeons, Columbia University, N. Y.; Aural Surgeon, N. Y. Eye and Ear Infirmary; formerly Attending Aural Surgeon, Minturn Hospital;

Assistant Surgeon Dep. of Laryngology and Otology, Bellevue Hosp., New York. Eighth edition, thoroughly revised, with 192 illustrations and two plates. 576 Pp. Cloth, \$4.00. Philadelphia: Lea & Febiger, 1928.

THE NATURE OF MATTER, GRAVITATION AND LIGHT. By *Albert P. Mathews*, Ph.D., Professor of Biochemistry, University of Cincinnati. Pp. 220. New York: William Wood & Company.

BOOKS REVIEWED

ATLAS DER HISTOPOGRAPHIE GESUNDER UND ERKRANKTER ORGANE, von *Erwin Christeller*. Leipzig: George Thieme, 1927.

The work of Christeller has revolutionized the histologic study of normal and pathologic organs. He has been able with methods which he describes in the beginning of the book, to present sections of entire organs showing minute histopathology. The technic of the preparation of the sections while of interest, are particularly valuable to workers in pathology.

The topographic study of histologic changes in organs gives one a picture of the diseased organ with the seat of the disease in such a manner that it can always be remembered. This is in contrast with the usual sections which represent a small area, and which, in the photomicrograph can hardly give one a clear conception of the pathologic picture. This new field of histotopography, with sections of entire organs, fills the large gap between gross pathologic anatomy and microscopic pathology and borders on both these fields.

This remarkable work is difficult to describe, the sections alone telling the story. The first plates show pathologic changes in the heart and blood vessels. With each gross section of the entire organ there is shown in practically all the plates in the book a microphotograph of a portion of the pathologic tissue.

Many varieties of pathology in the spleen are shown. Many plates are given over to the lungs. Acute and chronic tuberculosis of the lungs and tuberculous pleuritis and malignancy in the lung are beautifully shown. Cirrhosis of the liver, gumma of the liver and hemangioma cavernosum of the same are shown as one could not see them in ordinary gross section.

It is well to repeat again that these sections show the entire organ with the portion showing pathology standing out in the sections. Thus one can get an accurate idea of the location and extent of the diseased tissue. The largest number of plates are given over to the genito-urinary tract of both the male and female. Hydronephrosis, pyonephrosis, tuberculosis and nephritis are shown. There are two outstanding plates showing papillary carcinoma of the bladder. Pathology in the scrotal sac and the prostate are shown in such a manner that they can be visualized more clearly than ever before. There are also a large number of plates at the end showing various changes in the brain.

This truly excellent pioneer work in a field that had for some time appeared to have reached its limitations gives the reader a clear understanding of the pathology of various diseases, a good deal of which was difficult to visualize before. This is a work which all practitioners of medicine, whatever the limitations of their field or scope of work may be, should have as part of their library. To those who are interested particularly in pathology this work offers more than anything of its kind previously published.

HAND ATLAS DER CYSTOSKOPIE. By *Kneise*. Second edition. Leipzig: Georg Thieme, 1926.

The second edition of this classic work presents a series of thirty-eight new plates, together with the sixty-four of the original work published in 1907. Unlike other atlases of cystoscopy in which the plates as reproduced are drawn by artists who have a varying degree of conception of cystoscopic pictures, these plates are made by the author himself. It can readily be seen that this is a distinct advantage for these plates

present accurate reproductions of the cystoscopic picture. The original work of sixty-four drawings was made with the indirect cystoscope with the picture reversed, but this is not a drawback, for one can readily orient himself in looking at the plates.

There are eighteen plates showing various parts of the normal bladder. The plates showing the pathology of various inflammations of the bladder are excellent. Prostatic hypertrophy as seen cystoscopically together with trabeculation is accurately pictured. There are eight plates showing beautiful pictures of various bladder stones, one of them just within the ureteral orifice and another that has recently been expelled. Foreign bodies left behind accidentally or which have been inserted by the patient are shown in five plates an incrustated ligature, parts of glass, and rubber catheters, one showing a shrapnel with some incrustation about it. The plates showing papillomata of the bladder together with their treatment by fulguration and their gradual recession and disappearance have never been demonstrated as well as in this atlas. Malignant growths of the bladder are also well represented. Fistulae, diverticula and trabeculation are excellent in their reproduction. The plates showing ureterocele are so well shown that it is difficult to see how, when one sees them for the first time cystoscopically they can be overlooked after having seen the plates. Ureteroscopy showing pus, blood and dyes as they come through the ureteral orifice is well pictured, as are also the steps in the passage of a ureteral catheter.

This work, as has been said previously, is a classic which should be in the hands of every urologist and particularly those who are beginners in cystoscopy.

ASTHMA—ITS DIAGNOSIS AND TREATMENT. By *William S. Thomas, M.D.*, Associate Attending Physician in Immunology, St. Luke's Hospital, New York. 279 pp. Twenty illustrations in black and white and six in color. Paul B. Hoeber, Inc., New York, 1928.

The author agrees that efforts toward non-specific desensitization have failed to produce the good results that were at first claimed in their favor. He assumes that improved results from the treatment of asthma have been made possible by means of the diagnostic aid of specific skin reactions to proteins and to vaccines. "The intelligent interpretation of these dermal phenomena has made it possible for asthma patients to obtain material and permanent relief, whereas a few years ago the best that could be hoped for was temporary palliation of their sufferings."

The latter statement is bold and requires strong proof. Proteins and vaccines, specific and non-specific, have their enthusiastic adherents. Whether such therapy can be pronounced as having made it possible for

asthma patients to obtain material and permanent relief needs further supportive evidence. Furthermore, it is highly improbable that students of the problem would accept, unmodified, the author's definition that asthma is a syndrome occurring in constitutionally predisposed individuals and having as its exciting cause exposure to or contact with some substance or physical condition to which they are abnormally sensitive.

An important yet brief chapter is the third dealing with pathology of asthma. The author's attempt to collect available information on this phase of the subject, in the light of meager reports and authentic material, is indeed to be commended.

The recent advances on the use of ephedrin are contained in this volume and give in a brief and systematic manner important facts concerning the value of this drug in palliative treatment. Other remedies are also mentioned, but rather inadequately, since some of them have been used since time immemorial and probably will not be replaced for their favorable effects for a long time to come.

It is quite clear that in the main stress is laid on the value of protein skin tests and specific desensitization. The autogenous vaccine treatment is the specific treatment of pollen asthma. In this connection the statements is made "By administration of successively increasing hypodermic injections of offending pollen extract or extracts desensitization (or hypodesensitization) is usually brought about, and complete or at least material relief is obtained." Unfortunately this cannot be accepted as fact, for surveys of the available authentic reports, while holding with the author that specific desensitization has a place in asthma therapy, lead to the conclusion that favorable results have been noted in little more than twenty-five per cent of cases. Unless the author has developed and employs some special technic which has been more successful than that practiced by other physicians, it would seem that his claims require thorough substantiation by the large numbers of case reports.

The chapter on non-specific radical methods of treating asthema fails to merit this title, nor does the text material in any way amplify it. The scant and unjustified reference to physiotherapy suggests the therapy. In view of the progress which has been made, here and abroad, with the use of physical agents in asthma, it seems that the least that could be done would be to give a brief summary of facts, as continued in the recent literature.

In general it may be said that this book represents a review of the experiences of the author and others, interested primarily in specific desensitization of asthmatic individuals, but fails in its endeavor to give a broad and comprehensive presentation of the subject of asthma, its diagnosis and treatment, by other means.

INTERNATIONAL ABSTRACTS

Complications Following the Application of Radium to Pelvic Lesions. Leda J. Stacy, M. D. The Am. J. of Roent. and Rad. Therapy, April, 1928.

1. In cases of carcinoma of the cervix a thorough physical examination is imperative; this should include a cystoscopic examination when bladder irritation exists, before radium treatment is instituted.

2. Great improvement often follows the use of a few short periods of irradiation at intervals of several days in cases of extensive malignancy in toxic patients.

3. When evidence of pelvic infection occurs treatment should be discontinued until all signs and symptoms of infection have subsided; it should be abandoned if the patient's condition is not good.

4. Tissue reaction with slow healing at times difficult to differentiate from extension of malignancy, may occur in the vesical and rectal mucosa producing local symptoms many months after the use of radium.

Ultra Violet Rays as Adjuvant in the Treatment of Leprosy. M. C. Cruz, M. D. Jour. P. I. M. A., March, 1928.

A group of 34 lepers receiving antileprosy injections of chaulmoogra ethyl esters were treated by local exposures to ultra violet rays from a quartz mercury vapor lamp.

The types of lesion treated were: infiltration, 21 cases; nodule, 4 cases; erythematous macule, 3 cases; leprotic ulcer, 3 cases; and trophic ulcer, 3 cases.

The duration of the treatment and observation period was eleven months. The total time of exposure varied from fifteen minutes to thirteen hours, the single exposures varying from two minutes to two hours.

The results show that the ultra violet rays produce no noticeable changes in the closed lesions beyond the transitory immediate effects, varying from erythema to blister formations. After subsidence of the reaction, the lesions returned to their former condition, and smears from them were still positive for *mycobacterium leprae*. The trophic ulcers showed little or no reaction after irradiations, while the leprotic ulcers showed brief temporary improvement, after which the healing was as slow as with other methods of treatment.

Electrotherapeutic Principles and Indications in Urology. Victor Cox Pederson, M. D. Jour. of Urology, May 1928.

There are certain general principles which apply to the use of any physical measure and almost equally

though less directly to all other measures. Simple and axiomatic examples are these:

1. Physiological results in improvement of the disease or condition are more important than such indices as meter and thermometer readings although as basic guides and elements of record they likewise are desirable.

2. Subjective sensation is similar to physiological results as a better guide in the end than meter and thermometer. Soothing agreeable though positive perception is meant. The patient is inclined to repose not excitation and the part to beneficial reaction and not to disturbance or relapse in symptoms.

3. Rest from treatment should be given so that the part may accept the influence imposed exactly as in exercise and sleep, eating and fasting, work and recreation and the like.

4. In medication we do not overdose and nearly intoxicate the patient. In physical therapy we do not weary and nearly exhaust the part and the patient. Divulsion of strictures has been supplanted by gradual dilatation. Tearing of the cervix has been abandoned in favor of rest-to-rest stretching with instruments before operation exactly as the oncoming head does not incessantly expand the canal.

The principles of hydraulics are often and may well be compared with those of electrotherapy. Relatively few patients do well under the heavy-stream douches, whereas almost all accept the shower, the needle bath and other efficacious though milder measures.

5. Pain or allied sensation usually proves improper type, strength, application of the current or frequency of visits. A reliable guide to the contrary is a decrease in the pain or other sensation present.

6. Absolute reliance on physical therapy to the exclusion of other well-established methods is not sound. For example, in urology instillations, injections and applications still have their sphere. Therefore all available adjuvants should be employed in varying sequences and relations. Tonics, diet and exercise care for the general health. The various current modalities are aided by thermotherapy, hydrotherapy, phototherapy, mechanotherapy, massage and the like.

Numerous indications for physical therapy are considered and application for the various agencies detailed. Much space is devoted to the electrothermic measures for cancer destruction as well as to the value of radium treatment. The chief aim of this review is to show the broad basis on which all the agencies of electrotherapy may be employed in urology, so as to prevent the error of too much reliance on high frequency currents alone.

Complete Retention of Urine of Prostatic Origin Treated by Electrocoagulation. Doctor J. G. Remijne. Am. J. P. T., June 1928.

Surgical diathermy will gain in importance when we have had more experience in managing it properly. For the treatment of prostatic hypertrophy it is undoubtedly of the utmost value. The advantages of this method are the following: (1) The treatment is not very dangerous. (2) It can be executed without pain after preliminary injection of novocaine in the urethra. (3) There is no bleeding. (4) The procedure is under continuous control of the forefinger. (5) All kinds of prostate trouble which involve retention can be tackled, even the atrophic prostate. (6) This method can replace a considerable number of otherwise unavoidable prostatectomies. (7) In cases in which operation cannot be carried out on account of the bad general condition diathermocoagulation can still be applied successfully.

Note—The probe is manufactured by the firm Krupp (Essen). The metal part of the probe is made of stainless steel, and the curve of the probe can be modified to some extent after heating it in warm water. Another probe has the form of a cystoscope with the plate on the inner surface near the top.

Radiation and Electrotherapy in Superficial Lesions. Frederick W. O'Brien, M. D. N. E. J. of M., May 10, 1928.

There is no good evidence that external radiation kills tumor tissue directly. If the chief value of radiation were to rest upon its escharotic effect, then it would seem that we have been guilty of great economic waste in employing x rays and radium to produce an effect as well obtained by the actual cautery, certainly a cheaper and less painful agent. A quotation is made from Bovie who cites many facts that seem to explain the reaction of the human body in its response to radiation. The choice of which agent to use should depend on the lesion to be treated and not on the kind of radiation available. Besides ultra violet radiation, certain kinds of electrical currents that produce thermal effects are often useful in the treatment of superficial lesions. Electrothermic methods are peculiarly adapted to the treatment of localized malignant growths occurring in any part of the oral cavity.

The author outlines the kinds of superficial lesions in which he has employed phototherapy or electrotherapy with some success. These include acne, chronic eczemas, lupus erythematosus, cellulitis, chronic abscess, paronychia, furuncle, carbuncle, basal cell epithelioma, thyrotoxicosis: tonsils, etc. Seventeen cases of whooping cough have been treated privately following Leonard's technic as developed at the Onshore Clinic of the Boston Floating Hospital. Twenty-five cases of asthma have been treated at the Boston City Hospital by x radiation and many relieved symptomatically for the longest period in their lifetime.

The author emphasizes that radiation therapy is not a panacea for it may do incalculable harm in the hands of the inexpert.

Treatment of Epithelioma About the Face, Mouth and Jaws. Earl C. Padgett, M. D. Jour. Mo. M. A., May 1928.

The treatment of epitheliomata about the oral region is based upon fundamental conceptions, three of which are especially important, namely: (1) The beginning lesion is thought to be a purely local condition and its destruction leads to a cure. (2) When metastasis occurs the malignant cells travel by way of the lymph channels embolically and not by permeation of tissue. Thus, as a rule, the intervening tissue between the local lesion and the lymph nodes is not involved, although the local lesion itself may infiltrate along tissue planes. (3) The collar of lymphatics surrounding the neck form a barrier which is not penetrated by embolic cancer cells in more than one or two per cent of the cases.

Irradiation and electrocoagulation as destructive agents are discussed. Such conditions as basal cell epithelioma of the skin, epithelioma of the lip and cheek, and carcinoma of the paranasal sinuses are considered from the standpoint of therapy. More severe conditions such as carcinoma of the pharynx and epithelioma of the tongue and neighboring mucosa are detailed from the standpoint of histologic structure with the conclusion that the end results following operation will depend upon the type of cases selected for operation. Statistics are given of results obtained with the various methods.

From the perusal of recent surgical and radium statistics the conclusion is substantiated that for accessible malignant lesions, not hopeless from the first because of undifferentiated and pleomorphic cellular characteristics, surgery is indicated whenever possible for both the primary growth and tributary lymphatic field, providing a complete cure is attempted. Proper evaluation of the best method of treatment for the individual case should occur when the cellular characteristics, the irradiation response and the operability are all considered. The ideal is a combination of such knowledge in the individual who presumes to treat cancer, unless a smoothly working unit composed of a pathologist, radiologist and surgeon is available concurrently.

Medical Diathermy in Chronic Middle Ear Deafness. Dan McKenzie, M. D. Am. J. P. T., June 1928.

A beam of high frequency current traverses the tissues between the two electrodes and raises their temperature. The electrodes used are made of metal and are of the same size, their superficial measurements being 1 inch by 1½ inches. One is placed over the mastoid process and the other is laid upon the face just below the prominence of the malar bone, or a little behind it. The current varies from 0.7 to 1.4 amp., according to the patient's tolerance. Treatment should be repeated every other day.

With the electrodes in the positions described, the current occupies the mastoid process, the middle ear and cochlea, the petrous bone and the eustachian tube;

then it crosses the middle line by the body of the sphenoid to pass by way of the floor of the orbit, the lesser wing of the sphenoid and the body of the superior maxilla to the cheek.

The indications and contraindications are given as are also results obtained.

In favorable cases improvement in the hearing and diminution of the tinnitus takes place. Some specific cases are cited. One must be guided by results in carrying out the treatment. Treatment is still in the experimental stage, but experience with it has already been so unexpectedly favorable that the author has no hesitancy in recommending it to the attention of otologists as by far the most promising of all the recent plans proposed for the alleviation of "dry deafness."

Autocondensation in Abdominal Pain of Arteriosclerotic Origin. Harry Gause, M. D. Colorado Medicine, April, 1928.

Autocondensation is useful in the control of abdominal pain of arteriosclerotic origin, reports Gause of Denver in *Colorado Medicine*, April 1928. In a case report of a patient with "angina abdominalis" which he defines as a "symptom complex secondary to cardiovascular disease occurring usually in persons past 40 with arteriosclerosis, characterized by abdominal pain, which tends to be severe, paroxysmal and recurring, associated with general weakness, loss of weight, and frequently abdominal distention and belching," he obtained relief from the excruciating paroxysms of abdominal cramps by the use of autocondensation given daily for fifteen minute periods. Previously amyl nitrate and morphine has been required for control of the pain. By combining the autocondensation together with the usual management for arteriosclerosis, the patient was kept comfortable for a period of over a year, whereas previously the patient's life had become burdensome. The pathologic basis for the pain in his patient, he ascribes to an arteriosclerotic narrowing of the arterioles supplying the intestine which forces the bowel to work under stress, thereby giving rise to visceral pain. Although the patient also had generalized arteriosclerosis and heartblock as shown by electrocardiographic tracing, the abdominal cramps masked the remainder of the symptoms. The prognosis, however, in his patient is grave because of the ever menacing heartblock, although he has been kept in a state of comparative comfort for over a year.

Diathermy of the Spleen in Bronchial Asthma. Dr. R. Gassul of Leningrad. Deutsche Med. W., Vol. 52, No. 41.

Dr. R. Gassul renders a highly interesting preliminary report on the successful treatment of severe bronchial asthma by diathermization of the spleen. As a scientific basis for this procedure it is pointed out that in the light of modern research of anaphylaxis, bronchial asthma must be regarded as a syndrome of hypersensitivity and increased reaction on the part of the respiratory apparatus to varying foreign substances or

even psychic influences. Behind this lies a constitutional toxic idiopathy of the area controlled by the vegetative nervous system. As a general rule so-called asthmagenic substances, furs, hair, feathers, dust from plants, cereals, dyes, animal excretions and the like) introduced into the human body through the air, by mouth or parenterally repeatedly and in small doses are directly responsible for the asthmatic attacks. Such anaphylactogenous substances if injected intradermally even in a dilution of 1:100,000 produces a wheal of urticaria in allergic asthmatics.

In other cases there exists a multiple hypersensitivity—a polyvalence—of a constitutional character. It is a clinical fact, proven also by experiment, that anaphylaxis and asthma attacks in man (and in animals) show similar phenomena.

Modern treatment of asthma is based on this viewpoint. One endeavors to find the anaphylactogen by cutaneous vaccinations, and, if this proves impossible, to produce active immunization by serial and progressive vaccinations. Unfortunately this is extremely difficult in most instances.

But we know from photophysiology that in the presence of antigens antibodies are formed principally in the spleen, and we also know that increased flooding of the spleen (active hyperemia) increases this function of the spleen.

The author and his collaborator (Dr. S. Jakowlewa) applied this idea practically in sixty cases of severe asthma. The method of treatment was simple. Dry electrodes were applied over the region of the spleen and behind over the course of the ninth and tenth ribs. The dose was 0.8-2.5 amperes. Fifteen to 30 seances are necessary. At first the seances produce violent asthmatic attacks and the patients should be warned about this possibility. After a few seances the attacks cease and in some cases have been absent as long as one and one-half years.

Gassul admits that he is not yet prepared to make a definite statement regarding the actual value of this method. That it has a definite effect he has been able to determine by certain tests of the blood and reactions, details of which are to be published at a later date. But he points out that the method is physiologically sound and harmless. Studies are being made whether other anaphylactic conditions respond to this method and whether diathermy of other endocrine organs has an effect on asthma. (Editorial note: It appears that in view of the harmlessness of this procedure an opportunity presents itself to many scientifically inclined physical therapists not only to check the reported experiences but to undertake a series of observations along the lines indicated in the last paragraph of this preliminary report.)

Physiotherapy in Medicine. Elias Margo, M. D. J. Oklahoma S. M. A., Feb. 1928.

Margo points out that through sad neglect an important physical remedy used by the medical profession for centuries is massage. All physical remedies are classified in practice in three kinds: mechanical, thermal

and chemical. Elementary science teaches us that for every action there is a reaction, either physical or chemical. All therapy deals with the reactions of inflammation. We have learned that the object of physiotherapy is inflammatory reactions and its activities are limited to normal living tissue. Physical therapy is an aid or adjuvant and all known methods should also be employed. Failures with physical therapy frequently occur. A large number are due to faulty technic. Attention is also directed to the value of the heat factor in therapy and to the agents producing chemical effects. The value of x ray therapy is likewise emphasized.

Postural Defects—Correctable in School Physical Education Classes. William Arthur Clark, M. D. Cal. and West. Med., May, 1928.

The necessity for corrective classes in physical education is readily seen when one examines the statistics of findings in large series of cases where routine physical examinations have been made of great numbers of children or young men and women as in universities, large school systems, and in recruits for military service. Such statistics show a certain percentage of any large group to be abnormal in one or more aspects of body mechanics. In some series this percentage is surprisingly large.

There is a vicious circle in posture which has many links. Starting with the link which has to do with the structural framework of the body, we have: (1) slump in the skeleton; (2) interference with organs; (3) poor physiologic function; (4) malnutrition and poor aeration; (5) depressed muscle tone which causes slump in the skeleton, etc. It is difficult, perhaps, in each individual case to tell where the circle started, but it may be attacked and a link broken anywhere. The links with which the physical education teacher has to deal are mostly those of depressed muscle tone and slump in the skeleton.

The author compares the human spine to that of quadrupeds. Deviations in the auteroposterior and lateral planes are more or less fully discussed. Etiological factors involved are considered and the author's viewpoint stressed. Some suggestions at correction of defects are mentioned.

A Rational Treatment of Hypertrophic Rhinitis. Louis Feldman, M. D. N. E. J. of M., May 17, 1928.

The definition, causes and symptoms introduce the main subject for discussion, i. e.: the treatment of hypertrophic rhinitis. As far as a method of handling this condition is concerned, several factors are to be considered. One must have a means by which the status of the membrane may be altered; the circulation and nutrition of the tissues improved, and the excessive tissue shrunken without actually destroying mucous membrane and surface area, thus preventing complications and the much dreaded sequela, atrophic rhinitis, with its various distressing accompaniments.

Galvanic current with its polarity effects was the basis for the suggestion that led up to its use, particularly the positive pole. The properties are briefly outlined. The author precedes intranasal galvanization by diathermizing the membranes with a monoterminally non-vacuum flat nasal electrode. In all 50 cases were treated with 80 per cent cures.

Physical Therapy and Its Adjunctive Value in Medicine and Surgery. Joseph E. G. Waddington, M. D. Jour. M. S. M. S., May, 1928.

Waddington calls attention to the fact that in spite of official recognition, physical therapy is being quite voluntarily discredited by superabundant enthusiasm on the one hand and ultra-conservatism on the other. The beneficial results attainable from some one or more forms of physical therapy are so indubitably attested by government hospitals, various sanatoria and numerous private clinics—both here and abroad—that it simply requires judiciously exercised common sense in conjunction with scientific research and practical experience in order to make this therapy generally and popularly available. Rehabilitation and industrial clinics attached to practically every large industry where accidents are of frequent occurrence attest to a time and money saving appreciation by the none too sentimental or impressionable business world.

The internist, surgeon, specialist, all alike are dependent one upon the other; no one can isolatedly boast that his special field of ameliorative or curative endeavor is supremely successful; only by and through the help of each other can the optimum of desired health be laboriously attained. Every medical man can and does personally apply some more or less simple or complicated physical therapy agency or agencies in his daily practice, but physical therapy—like the practice of medicine itself—is too voluminous a field for every physician to expect to personally qualify in all its intricate phases. He consequently should acknowledge that scientific physical therapy involves far more than the simple prescribing of fresh air and exercise; or even the occasional administration of some electrical, mechanical, or phototherapy appliance; that even a well equipped office does not necessarily imply a correspondingly well equipped mind; and, lastly, that the physical therapist should be a thoroughly experienced physician thoroughly trained to recognize when and when not physical therapy may be adjuvantly or non-adjuvantly indicated.

Cancer Studies in Massachusetts. 2. Habits, Characteristics and Environment of Individuals with and without Cancer. Herbert L. Lombard, M. D., and Carl R. Doering, M. D. N. E. J. of M., April 26, 1928.

Variations in the habits of cancer patients cannot be studied without the use of good controls, which are most difficult to obtain. We believe our sample to be as nearly satisfactory as is reasonably possible to get on a large scale.

As only large differences between controls and cancers need be considered the size of the sample is adequate. The collection of data on cancer patients without similar data on controls is valueless in the determination of factors influencing the causation of cancer.

Bad teeth in males are more common among the cancer group than among the controls. In our sample heavy smoking was largely pipe smoking and was particularly more common in those individuals with cancer of the buccal cavity.

The figures gave a suggestion of a hereditary predisposition to cancer, but the volume of unknowns made definite conclusions impossible. The cancer group ate less than the controls, but this probably is wholly due to the presence of the disease.

Although we realize that the figures in this study are too small and incomplete for significant conclusions to be drawn, they are presented to show the methods used in order that others may conduct similar studies. We feel that other independent samples collected in a like manner would do much to either prove or disprove our findings.

A New Epididymis Clamp for Diathermy. Albert Crance. Jour. of Urology, May 1928.

On the basis of assuming that diathermy is a specific for epididymitis, Crance invented a special clamp for diathermy treatment. He cites the objections to the clamps now on the market and submits his own because it overcomes many of the previous difficulties. This new device has a forceps type of handles, thereby eliminating all inconvenience in the matter of adjustment. If during the course of a treatment, it becomes necessary to increase the tension, the procedure is accomplished by merely closing up one notch with the ring handles. Likewise, if too tight, the instrument may be released by opening the ring handles. No set-screw fussing is necessary.

The clamp is provided with a spring lock between the ring handles and the joint, which keeps the tension at any point desired. The instrument also has nicked applicators of correct proportions, and are also set on a ball-socket joint to conform to size or shape of each individual case.

This instrument has been worked out with the cooperation of the Wappler Electric Company, and it is now manufactured by them.

The Treatment of Facial Scars. H. Lyons Hunt, M. D. Am. Jour. of Surgery, Vol. IV, No. 3, March 1928.

Not all scars should be subjected to surgical treatment. An obsession relative to a scar, syphilis, a tuberculous or a keloid diathesis, a temporary bronchial affection or other constitutional disease may make it unwise to undertake a surgical procedure.

The result in corrective surgery about the face and neck is more or less dependent upon the location of the scar. More pleasing results are always secured,

other things being equal, when incisions follow Langer's lines of tension.

The treatment of scars must take into consideration both the type of scar and its etiology.

The procedure adopted for the elimination of a scar may require grafting, the transplantation of tissue, or simply excision of the scar, with undercutting and approximation of the wound edges. The latter is the preferable procedure under suitable conditions.

The after-treatment of a wound is fully as important as the surgical procedure itself. It includes dusting the wound with turtle bile, the application of cold, exposure to air and sunlight, and the daily application of a 2 per cent solution of thiocyanate in physiological saline solution.

Careful attention to the details described make it possible to minimize or practically efface the vast majority of disfiguring scars.

Malignancy of the Larynx and Esophagus Treated by Radium Emanation. Frank Richard Herriman, M. D. Med. Herald and Physiotherapist, May 1928. (Original paper, Laryngoscope, Sept. 1927.)

Radium has now few advocates as a treatment of laryngeal or esophageal disease. This is because of difficulties with the older technic. The author has now revived this therapy, using a new technic—however—the implantation of radium emanation in screened "seeds," directly into the affected tissues.

For laryngeal growths the malignant area is exposed by direct laryngoscopy or the suspension method—the latter being preferable. For growths in the esophagus, a standard esophagoscope is employed. After adequate exposure, the entire area of malignancy is implanted at regularly spaced intervals with the removable platinum radon seeds designed by Joseph Muir of New York. The design of the seeds used by the author obviates practically all the difficulties encountered under the older methods.

Details of eight cases selected from a larger series are given. All the patients were "hopeless" so far as surgery was concerned, at the time the implantations were undertaken. When this report was made at the New York Academy of Medicine, December 22, 1926, the patients were all alive, although the period which had elapsed since the treatment was begun was insufficient to permit the drawing of any conclusions as to the permanent relief which could be afforded.

The author feels that even if no more than temporary palliation has been secured, this, in itself, is well worth the effort required to apply the treatment, inasmuch as every patient had been doomed to die within a few weeks, when they first came under his care. Most of them had been able to return to their regular occupations, and even those who were still obliged to wear tracheotomy tubes were comfortable and pursuing their ordinary mode of life.